Alcator C-Mod, Final Technical Report

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Abstract

Alcator C-Mod is the third in a series of compact high-field tokamaks built and operated on the MIT campus, the first to incorporate advanced shaping and poloidal divertors. For most of its 23 year operational history, C-Mod was the only diverted tokamak in the world program exclusively using all metal high-Z plasma facing components, and the only diverted tokamak able to operate at and above the magnetic field strength of ITER, and for many other burning plasma tokamak designs. The C-Mod facility also exclusively used RF waves for non-inductive heating and current drive, highly relevant to burning plasma applications and likely to be the main such tools in any commercial tokamak power reactor. A comprehensive summary of the key technical accomplishments from the C-Mod program is published in the review paper, M. Greenwald, et al., Phys. Plasmas 21(2014)110501. This final report contains a brief overview of those results, along with updates covering the final 3 years of operation, through September 2016. Ongoing analysis and modeling based on the archive of Alcator C-Mod data continues to provide new results, and this can be expected to continue for many years to come.

Introduction

Alcator C-Mod [Hutchinson, et al., Phys. Plasma 1(1994)1511, and Marmar, Fusion Sci. Technol 51(2007)261] is a compact, high-field tokamak, whose unique design and operating parameters have produced a wealth of new and important results since it bagan ipeation in 1993, contributing data that extends tests of critical physical models into new parameter ranges, and into new regimes. Using only high-power radio frequency (RF) waves for heating and current drive, with innovative launching structures, C-Mod operated routinely at reactor level power densities and achieves plasma pressures higher than any other toroidal confinement device. C-Mod spearheaded the development of the vertical-target divertor, and has always operated with high-Z metal plasma facing components --- approaches subsequently adopted for ITER and likely to be applied in any power-producing reactor. C-Mod has made ground-breaking discoveries in divertor physics and plasma-material interactions at reactor-like power and particle fluxes, and elucidated the critical role of cross-field transport in divertor operation, edge flows and the tokamak density limit. C-Mod developed the I-mode and the Enhanced Dα H-mode regimes, which have high performance without large edge localized modes, and with pedestal transport self-regulated by short-wavelength electromagnetic waves. C-Mod has carried out pioneering studies of intrinsic rotation and demonstrated that self-generated flow shear can be strong enough in some cases to significantly modify transport. C-Mod made the first quantitative ling between the pedestal temperature and the I-mode's performance, showing that the observed self-similar temperature profiles were consistent with critical-gradient-length theories, and followed up with quantitative tests of nonlinear gyrokinetic models. RF research highlights include direct experimental observation of ion cyclotron range of frequency (ICRF) mode-conversion. ICRF flow drive, demonstration of lower-hybrid current drive at ITER-ike densities and fields, and, using a set of novel diagnostics, extensive validation of advanced RF codes. Disruption studies on C-Mod provided the first observation of no-axisymmetric halo currents, and non-axisymmetric radiation in mitigated disruptions. Details of nearly all these results can be found in the review paper, 20 years of research on the Alcator C-Mod tokamak, M. Greenwald, et al., Phys, Plasmas 21(2014)110501. The balance of this final report summarizes updates and new results obtained subsequent to the publishing of that review paper, through to the end of the Cooperative Agreement.

Alcator C-Mod Facility and Engineering

Alcator C-Mod was a compact, high-field tokamak, with an advanced divertor, molybdenum plasma facing components, and magnets inertially cooled with liquid nitrogen. Approval to begin the design of C-Mod was given in April of 1987, the first plasma discharges were obtained in October of 1992, and the final discharge was on September 30, 2016. C-Mod operated at a maximum toroidal field of 8.11 T and plasma current of 2.02 MA, but the engineering design was qualified for 9 T and 3 MA operation, with disruption field variation rates of 1 T/ms. These high fields and currents, together with the forces expected during full current disruptions, required novel engineering concepts to be developed throughout the design process. Toroidal field flat-tops of up to 3.9 s were obtained at 5 T, which was reduced to about 1 s at 8 T. The C-Mod engineers, scientists and students pioneered in the design of high field tokamak magnets and extremely high current joints, the design of metal divertors and cryopumps, ICRF antennas and coupling structures, Lower Hybrid launchers, and a comprehensive array of advanced diagnostics designed to survive a very hostile environment. A picture of some of these components is shown in figure 1. A table of achieved and design parameters is shown in Table I.

Alcator C-Mod produced over 35,000 plasma discharges with a startup reliability of 80%. The engineering reliability, as defined by all systems operating properly during the plasma attempt, was over 96%. These excellent engineering statistics would not have been possible without the hard work and dedication of a remarkable technical staff.

During its last plasma operation day Alcator C-Mod broke its own world's record volume average plasma pressure, achieving 0.207 MPa. We expect this record to stand for at least seven years.

Figure 1. In-vessel picture showing from left to right the C-Mod inner molybdenum wall and lower divertor, the lower hybrid launcher, and one of three ICRF antennas.

TABLE I

Major Machine Parameters for Alcator C-Mod

Major Radius (m)	0.68
Minor Radius (m)	0.21
Maximum Elongation	1.85
Maximum Triangularity	0.85
Maximum Toroidal Field (T)	8.11 (9 T design)
Maximum Plasma Current (MA)	2.02 (3 MA design)
Plasma Volume (m^3)	1
Maximum Discharge Length (s)	<5
Maximum Stored Plasma Energy (kJ)	250
Vessel Volume (m^3)	4
Highest Plasma Pressure (MPa)	0.207
TMP Pumping Speed N_2 (l/s)	2000
Effective Pumping Speed N_2 (l/s)	500
Ohmic Heating Power (MW)	2.7
ICRF Source Power (MW)	8
Lower Hybrid Source Power (MW)	3
Peak Available Utility Power (MVA)	32
Peak Extracted Power Alternator/Flywheel (MVA)	400 design
Total Stored Energy Alternator/Flywheel (GJ)	2

Core Transport Physics

Recent core transport activity has focused on multi-scale turbulence interactions, the indluence of trapped electron modes on core energy transport, the LOC/SOC transition, understanding I-mode, intrinsic rotation, impurity transport, fluctuation diagnostics, stiffness/critical gradients and uncertainty quantification. At least 32 papers on these topics have been published.

Multi-scale turbulence: multi-scale gyrokinetic simulations that capture ion and electron scale turbulence simultaneously have revealed the dynamics of cross scale energy transfer and zonal flow modification that give rise to heat losses. These computationally expensive simulations have provided a likely explanation for the great unsolved problem of electron heat loss in tokamak plasmas.

Trapped Electron Modes: Density gradient driven trapped electron modes were found to dominate inner core transport in moderately peaked H-mode plasmas in both C Mod and DIII-D, allowing local control of density peaking with electron heating. Gyrokinetic simulations reproduce the particle, electron thermal, and ion thermal energy fluxes in the experiments within measurement uncertainty in both Alcator C-Mod and DIII-D. Nonlinear gyrokinetic simulations using GS2, carried out for Alcator C-Mod experiments, revealed that the effective critical density gradient above which TEM turbulent transport becomes stiff lies well above the linear threshold for instability at high collisionality. This non-linear upshift in the Trapped Electron Mode (TEM) critical density gradient is associated with zonal flow dominated states, and increases strongly with collisionality. Alcator C-Mod experiments are consistent with this prediction – the H-mode ITB density gradient is effectively limited by the TEM nonlinear critical density gradient during on-axis heating, which arrests density peaking as it increases with time.

The LOC/SOC transition: Several phenomenological transformations occur at the LOC/SOC transition- rotation reversals, 'non-local' cutoff and turbulence changes. The disappearance of measured electron temperature fluctuations in going from LOC to SOC has been captured in gyrokinetic simulations. The 'non-local' cutoff in cold pulse propagation can be explained without invoking non-local effects.

Understanding I-mode: Long wavelength density and temperature fluctuations in the core are found to decrease significantly at the L- to I-mode transition. Non-linear gyrokinetic simulations suggest that ExB shearing and increased profile stiffness are responsible for the reduction in turbulence.

Intrinsic rotation: The magnitude and scaling of intrinsic toroidal rotation in H- and I-mode plasmas agrees with the predictions of a fluctuation entropy balance model which gives a Mach number proportional to ρ^*. In plasmas with LHCD, the direction of the rotation depends upon the value of q_0, with co-current rotation see in discharges with significant current drive. In L-mode plasmas, rotation reversals cannot be due to changes in electron kinetic profile second derivatives.

Impurity transport: Impurity confinement has been characterized in L-, I- and H-mode plasmas, with the confinement time proportional to the pedestal density gradient across all regimes. The insensitivity of impurity transport to rotation profile shape in ICRF heated L-mode plasmas is captured in gyrokinetic simulations.

Temperature and density fluctuation diagnostic development: A CECE diagnostics has been built for C-Mod enabling measurement of spatially localized electron temperature fluctuations, for direct comparison to gyrokinetic simulations. In addition, a fast TCI diagnostic has been fabricated for looking at long wavelength density fluctuations.

Stiffness/critical gradients: Electron temperature profile stiffness has been explored by two different methods- analyzing heat pulse propagation by use of partial sawteeth and by using magnetic field jogs to sweep the radial coverage of ECE. Comparison with gyrokinetic simulations suggests that ETG mode turbulence is important in determining the electron temperature profile shape.

Uncertainty quantification: Gaussian process regression has been used to obtain rigorous error bars in kinetic profiles, including gradients and 2nd derivatives, with a variety of applications.

Pedestal Physics, Confinement Transitions and access to I- and H-mode

C-Mod experiments have explored access to H-mode and I-mode at magnetic fields approaching 8T, the highest field achieved to date in a diverted tokamak. Results at up to 8 T confirm that the L–I power threshold varies only weakly with field, and that the power range for I-mode increases with field; Conditions for I–H transitions have complex dependences on density as well as power. Changes in turbulence in the pedestal region accompany the transition from L-mode to I-mode.

Hubbard, A; Baek, SG; Brunner, D; Creely, A; Cziegler, I; Edlund, E; Hughes, J; LaBombard, B; Lin, Y; Liu, Z; Marmar, E; Reinke, M; Rice, J; Sorbom, B; Sung, C; Terry, J; Theiler, C; Tolman, E; Walk, J; White, A; Whyte, D; Wolfe, S; Wukitch, S; Xu, X; "Physics and performance of the I-mode regime over an expanded operating space on Alcator C-Mod" *Nuclear Fusion*, **57** (12) 126039 (2017). https://doi.org/10.1088/1741-4326/aa8570

Hubbard, AE; Osborne, T; Ryter, F; Austin, M; Barrera Orte, L; Churchill, RM; Cziegler, I; Fenstermacher, M; Fischer, R; Gerhardt, S; Groebner, R; Gohil, P; Happel, T; Hughes, JW; Loarte, A; Maingi, R; Manz, P; Marinoni, A; Marmar, ES; McDermott, RM; McKee, G; Rhodes, TL; Rice, JE; Schmitz, L; Theiler, C; Viezzer, E; Walk, JR; White, A; Whyte, D; Wolfe, S; Wolfrum, E; Yan, Z; Alcator C-Mod, ASDEX Upgrade and DIII-D Teams; "Multi-device studies of pedestal physics and confinement in the I-mode regime" *Nuclear Fusion* **56** (8) 086003 (2016). http://dx.doi.org/10.1088/0029-5515/56/8/086003

L-H transition studies have allowed extended evaluation of the ITPA scaling law for H-mode power threshold, and insight into the density dependence of the threshold at high magnetic field. Analysis of C-Mod data extends a result previously found on ASDEX Upgrade: the edge ion heat flux at the L-H transition is found to increase linearly with density. Furthermore, the Alcator C-Mod data indicate that the edge ion heat flux at the L-H transition also increases with magnetic field. Combining the data from Alcator C-Mod and ASDEX Upgrade yields a general expression for the edge ion heat flux at the L-H transition, which compares favorably to the ITPA scaling law at high density.

Tolman, EA; Hughes, JW; Wolfe, SM; Wukitch, SJ; LaBombard, B; Hubbard, AE; Marmar, ES; Snyder, PB; Schmidtmayr, M; "Influence of High Magnetic Field on Access to Stationary H-modes and Pedestal Characteristics in Alcator C-Mod" *Nuclear Fusion*, **58** (4) 046004 (2018). https://doi.org/10.1088/1741-4326/aaa8cc

Schmidtmayr, M; Hughes, JW; Ryter, F; Wolfrum, E; Cao, N; Creely, A; Howard, N; Hubbard, A; Lin, Y; Reinke, M; Rice, J; Tolman, E; Wukitch, S; Ma, Y; "Investigation of the critical edge ion heat flux for L-H transitions in Alcator C-Mod and its dependence on B_T" *Nuclear Fusion*, **58** (5) 056003 (2018). https://doi.org/10.1088/1741-4326/aaaed0

Helium majority experiments were performed to compare with deuterium discharges, and inform ITER early operations. The power to access ELMy H-mode in He was found to be greater than ~2 times that for D discharges, in the low density region <1.4 × 1020/m3. However, it appeared to follow the D threshold for higher densities.

Kessel, CE; Wolfe, SM; Reinke, ML; Hughes, JW; Lin, Y; Wukitch, SJ; Baek, SG; Bonoli, PT; Chilenski, M; Diallo, A; Alcator C-Mod Team; "Helium Experiments on Alcator C-Mod in Support of ITER Early Operations" *Nuclear Fusion*, **58** (5) 056007. https://doi.org/10.1088/1741-4326/aab1b7

C-Mod research contributes to a growing body of research on multiple experiments, and from numerical simulation, pointing to a picture of the L-H transition in which edge shear flows interacting with edge turbulence create the conditions needed to produce a non-zero turbulent Reynolds stress at and just inside the LCFS during L-mode discharges. The dynamics of transitions between confinement regimes have been studied on C-Mod using gas-puff-imaging, with a focus on the interaction between the edge drift-turbulence and the local shear flow. A key finding is that both the drive for edge zonal flow and the initial reduction of turbulence fluctuation power are consistent with a lossless kinetic energy conversion mechanism, which consequently mediates the transition into H-mode. The nonlinear drives involved in these processes were evaluated experimentally over a range of values of the plasma current, density and auxiliary heating, in order to establish parametric dependences which might lead to predictive capability. C-Mod L-mode data have been used as the basis for simulations with the gyrokinetic particle-in-cell code

XGC1, which purport to observe an edge confinement mode transition with turbulence and flow changes qualitatively similar to experiment.

Cziegler, I; Tynan, GR; Diamond, PH; Hubbard, AE; Hughes, JW; Irby, J; Terry, JL; "Zonal flow production in the L-H transition in Alcator C-Mod" *Plasma Physics and Controlled Fusion* **56** (7) 075013 (2014). http://dx.doi.org/10.1088/0741-3335/56/7/075013

Cziegler, I; Tynan, GR; Diamond, PH; Hubbard, AE; Hughes, JW; Irby, J; Terry, JL; "Nonlinear transfer in heated L-modes approaching the L-H transition threshold in Alcator C-Mod" *Nuclear Fusion* **55** (8) 083007 (2015). http://dx.doi.org/10.1088/0029-5515/55/8/083007

Tynan, GR; Cziegler, I; Diamond, PH; Malkov, M; Hubbard, A; Hughes, JW; Terry, JL; Irby, JH; "Recent progress towards a physics-based understanding of the H-mode transition" *Plasma Physics and Controlled Fusion* **58** (4) 044003 (2016). http://dx.doi.org/10.1088/0741-3335/58/4/044003

Chang, CS; Ku, S; Tynan, GR; Hager, R; Churchill, RM; Cziegler, I; Greenwald, M; Hubbard, AE; Hughes, JW; "A fast low-to-high confinement mode bifurcation dynamics in a tokamak edge plasma gyrokinetic simulation" *Physical Review Letters* **118** (17) 175001 (2017). https://doi.org/10.1103/PhysRevLett.118.175001

Ku, SH; Chang, CS; Hager, R; Churchill, RM; Tynan, G; Cziegler, I; Greenwald, M; Hughes, J; Parker, S; Adams, M; D'Azevedo, E; Worley, P; "A fast low-to-high confinement mode bifurcation dynamics in the boundary-plasma gyrokinetic code XGC1" *Physics of Plasmas*, **25** (5) 056107 (2018). https://doi.org/10.1063/1.5020792

I-mode pedestal

I-mode is an ELM-free regime features high energy confinement and a steep temperature pedestal, while particle confinement remains at L-mode levels, giving stationary density and avoiding impurity accumulation. I-mode has now been obtained over nearly all of the magnetic fields and currents possible on C-Mod (Ip 0.55–1.7 MA, Bt 2.8–8 T). I-modes have been maintained in near-DN configurations, leading to improved divertor power flux sharing. Joint ITPA studies with ASDEX Upgrade and DIII-D accessed I-mode over a wide range of device parameters and pedestal conditions. Pedestals are stable to peeling–ballooning modes, consistent with lack of ELMs. Access to I-mode is independent of heating method (neutral beam injection, ion cyclotron and/or electron cyclotron resonance heating). Normalized energy confinement H 98,y2 $\geq$ 1 has been achieved for a range of 3 $\leq$ q 95 $\leq$ 4.9 and scales favorably with power. Core transport simulations are giving insight into the observed turbulence reduction, profile stiffness and confinement improvement. Gas puff imaging (GPI) and gas puff charge exchange recombination spectroscopy (GP-CXRS) were used to localize two I-mode features, a weakly coherent mode (WCM) and a putative geodesic acoustic mode, to the outer shear layer of the radial electric field (Er) well. This results in a weak plasma frame phase velocity mostly along the electron diamagnetic drift direction for the WCM. Using C-Mod experimental data as simulation input, the weakly coherent mode (WCM) in the edge of I-mode has been studied by a six-field two-fluid model based on the Braginskii equations under the BOUT++ framework. The WCM simulation shows some similarities to the experimental features of the mode, and indicates that free energy for the fluctuations is mainly provided by the electron pressure gradient.

Hubbard, AE; Osborne, T; Ryter, F; Austin, M; Barrera Orte, L; Churchill, RM; Cziegler, I; Fenstermacher, M; Fischer, R; Gerhardt, S; Groebner, R; Gohil, P; Happel, T; Hughes, JW; Loarte, A; Maingi, R; Manz, P; Marinoni, A; Marmar, ES; McDermott, RM; McKee, G; Rhodes, TL; Rice, JE; Schmitz, L; Theiler, C; Viezzer, E; Walk, JR; White, A; Whyte, D; Wolfe, S; Wolfrum, E; Yan, Z; Alcator C-Mod, ASDEX Upgrade and DIII-D Teams; "Multi-device studies of pedestal physics and confinement in the I-mode regime" *Nuclear Fusion* **56** (8) 086003 (2016). http://dx.doi.org/10.1088/0029-5515/56/8/086003

Hubbard, A; Baek, SG; Brunner, D; Creely, A; Cziegler, I; Edlund, E; Hughes, J; LaBombard, B; Lin, Y; Liu, Z; Marmar, E; Reinke, M; Rice, J; Sorbom, B; Sung, C; Terry, J; Theiler, C; Tolman, E; Walk, J; White, A; Whyte, D; Wolfe, S; Wukitch, S; Xu, X; "Physics and performance of the I-mode regime over an expanded operating space on Alcator C-Mod" *Nuclear Fusion*, **57** (12) 126039 (2017). https://doi.org/10.1088/1741-4326/aa8570

Walk, JR; Hughes, JW; Hubbard, AE; Terry, JL; Whyte, DG; White, AE; Baek, SG; Reinke, ML; Theiler, C; Churchill, RM; Rice, JE; Snyder, PB; Osborne, T; Dominguez, A; Cziegler, I; "Edge-localized mode avoidance and pedestal structure in I-mode plasmas" *Physics of Plasmas* **21** (5) 056103 (2014). http://dx.doi.org/10.1063/1.4872220

Theiler, C; Terry, JL, Edlund, E; Cziegler, I; Churchill, RM; Hughes, JW; LaBombard, B; Golfinopoulos, T; Alcator C-Mod Team; "Radial localization of edge modes in Alcator C-Mod pedestals using optical diagnostics" *Plasma Physics and Controlled Fusion* **59** (2) 025016 (2017). http://dx.doi.org/10.1088/1361-6587/aa52e5
Liu, ZX; Xu, X; Gao, X; Hubbard, A; Hughes, J; Walk, J; Theiler, C; Xia, TY; Baek, SG; Golfinopoulos, T; Whyte, D; Zhang, T; Li, JG; "The physics mechanisms of the weakly coherent mode in the Alcator C-Mod Tokamak" *Physics of Plasmas* **23** (12) 120703 (2016). http://dx.doi.org/10.1063/1.4972088

H-mode pedestal regulation mechanisms

Most high confinement operation on C-Mod utilized ELM-stabilized regimes (e.g. EDA H-mode and I-mode) with pedestals regulated by turbulent transport. Dedicated experiments have sought to characterize these modes, including their localization in minor radius. GPI and GP-CXRS were used to localize the quasi-coherent mode (QCM) in EDA H-mode to the position of minimum Er to propagate along the ion diamagnetic drift direction in the plasma frame. However, a contrasting finding was obtained from probe measurements in ohmic EDA H-mode, in which the QCM was identified as an electron drift-wave located outside the Er well in a region of positive Er.

Theiler, C; Terry, JL, Edlund, E; Cziegler, I; Churchill, RM; Hughes, JW; LaBombard, B; Golfinopoulos, T; Alcator C-Mod Team; "Radial localization of edge modes in Alcator C-Mod pedestals using optical diagnostics" *Plasma Physics and Controlled Fusion* **59** (2) 025016 (2017). http://dx.doi.org/10.1088/1361-6587/aa52e5

LaBombard, Brian; Golfinopoulos, T; Terry, JL; Brunner, D; Davis, E; Greenwald, M; Hughes, JW; Alcator C-Mod Team; "New insights on boundary plasma turbulence and the quasi-coherent mode in Alcator C-Mod using a Mirror Langmuir Probe" *Physics of Plasmas* **21** (5) 056108 (2014). http://dx.doi.org/10.1063/1.4873918

The Shoelace antenna was built to drive edge fluctuations in the Alcator C-Mod tokamak, matching the wavenumber and frequency of the QCM, which is responsible for regulating transport across the plasma boundary in EDA H-mode. In 2016, the Shoelace antenna was located such that its driven transport could be measured directly by a reciprocating Mirror Langmuir Probe, while also making available gas puff imaging and reflectometer data to provide additional radial localization of the driven fluctuation. Analysis determines a ~4 mm-wide mode layer centered on or just outside the separatrix. A modest radial electron flux is inferred to accompany fluctuations coherent with the antenna. Plasma response to the antenna is stronger in EDA H-mode than in ELM-free H-modes without an intrinsic QCM.

Golfinopoulos, T; LaBombard, B; Brunner, D; Terry, JL; Baek, SG; Ennever, P; Edlund, E; Han, W; Burke, WM; Wolfe, SM; Irby, JH; Hughes, JW; Fitzgerald, EW; Granetz, RS; Greenwald, MJ; Leccacorvi, R; Marmar, ES; Pierson, SZ; Porkolab, M; Vieira, RF; Wukitch, SJ; Alcator C-Mod Team; "Edge Transport and Mode Structure of a QCM-Like Fluctuation Driven by the Shoelace Antenna" *Nuclear Fusion*, **58** (5) 056018 (2018). https://doi.org/10.1088/1741-4326/aab2c8

C-Mod identified some of the earliest direct evidence of density and magnetic fluctuations showing the stiff onset of an edge instability leading to the saturation of the pedestal between ELMs. These were part of dedicated experiments meant to test a key hypothesis of the EPED model, namely the existence of a soft limit set by microinstabilities such as the kinetic ballooning mode. Edge stability analyses indicated that the pedestal is unstable to both ballooning mode and kinetic ballooning mode in agreement with observations. The high-fidelity BOUT++ two-fluid code suite was used to simulate the observed quasi-coherent fluctuations (QCFs) noted between ELMs on C-Mod. Simulated QCFs are localized in the pedestal region having a predominant frequency at $f \simeq 300-400$ kHz and poloidal wavenumber at $k\theta \simeq 0.7$ cm^{-1}, and propagate in the electron diamagnetic direction in the laboratory frame. The overall signatures of simulation results for QCFs show good agreement with measurements.

Diallo, A; Hughes, JW; Greenwald, M; LaBombard, B; Davis, E; Baek, SG; Theiler, C; Snyder, P; Canik, J; Walk, J; Golfinopoulos, T; Terry, J; Churchill, M; Hubbard, A; Porkolab, M; Delgado-Aparicio, L; Reinke, ML; White, A; Alcator C-Mod team; "Observation of edge instability limiting the pedestal growth in tokamak plasmas" *Physical Review Letters* **112** (11) 115001 (2014). http://dx.doi.org/10.1103/PhysRevLett.112.115001

Diallo, A; Hughes, JW; Baek, SG; LaBombard, B; Terry, J; Cziegler, I; Hubbard, A; Davis, E; Walk, J; Delgado-Aparicio, L; Reinke, ML; Theiler, C; Churchill, RM; Edlund, EM; Canik, J; Snyder, P; Greenwald, M; White, A; Alcator C-Mod Team; "Quasi-coherent fluctuations limiting the pedestal growth on Alcator C-Mod: experiment and modeling" *Nuclear Fusion* **55** (5) 053003 (2015). http://dx.doi.org/10.1088/0029-5515/55/5/053003

Xu, XQ; Xia, TY; Yan, N; Liu, ZX; Kong, DF; Diallo, A; Groebner, RJ; Hubbard, AE; Hughes, JW; "Toward integrated multi-scale pedestal simulations including edge-localized-mode dynamics, evolution of edge-localized-mode cycles, and continuous fluctuations" *Physics of Plasmas* **23** (5) 055901 (2016). http://dx.doi.org/10.1063/1.4948283

H-mode Pedestal structure

Experiments on the Alcator C-Mod tokamak have utilized reactor-relevant magnetic fields to sustain substantially higher pedestal pressure than in other devices and allow close approach to the ITER H-mode baseline target pedestal pressure of 90 kPa. The EDA H-mode at high power has approached the pedestal predicted by EPED, and has given rise to volume-averaged core plasma pressure in excess of 0.2MPa, a world record value for a magnetic fusion device. Another approach to achieving high pressure utilizes a pedestal limited by current-driven modes at low collisionality, in which pressure increases with density and which allows access to a higher EPED solution, termed "super-H". C-Mod experiments accessed this regime, producing pedestals with pressures up to 80kPa (approximately 90% of the ITER target) and temperatures of nearly 2 keV.

Hughes, JW; Snyder, P; Reinke, M; LaBombard, B; Mordijck, S; Scott, S; Tolman, E; Golfinopoulos, T; Hubbard, AE; Marmar, E; Rice, J; White, A; Whyte, D; Wilks, T; Wolfe, S; "Access to pedestal pressure relevant to burning plasmas on the high magnetic field tokamak Alcator C-Mod" *Nuclear Fusion*, accepted. https://doi.org/10.1088/1741-4326/aabc8a

All three types of H-mode routinely observed at lower magnetic field on C-Mod have been extended toroidal field operation near 8T: EDA H-mode, nonstationary ELM-free regime, and H-mode. The parameter space in which these regimes occur at 7.8 T is consistent with lower magnetic field experience. Pressure pedestal height at 7.8 T was compared favorably to EPED model predictions. A scaling law for EDA density pedestal height developed between 4.5 T and 6.0 T was updated to include fields from 2.7 T to 7.8 T.

Tolman, EA; Hughes, JW; Wolfe, SM; Wukitch, SJ; LaBombard, B; Hubbard, AE; Marmar, ES; Snyder, PB; Schmidtmayr, M; "Influence of High Magnetic Field on Access to Stationary H-modes and Pedestal Characteristics in Alcator C-Mod" *Nuclear Fusion*, **58** (4) 046004 (2018). https://doi.org/10.1088/1741-4326/aaa8cc

Inboard (HFS) and outboard (LFS) radial electric field (Er) and impurity temperature (Tz) were measured in the I-mode and H-mode pedestal of C-Mod. Comparison of HFS and LFS profiles indicates that impurity temperature and plasma potential are not simultaneously flux functions. A technique based on total pressure conservation to align profiles measured at separate poloidal locations can be applied, an approach supported by theoretical considerations, as well as gyrokinetic neoclassical simulations. Since impurity density asymmetries are only present in plasmas with strong electron density gradients, and radial transport timescales become comparable to parallel transport timescales in the pedestal region, it is suggested that global transport effects relating to the strong electron density gradients in the pedestal are the main driver for the pedestal in-out impurity density asymmetry.

Theiler, C; Churchill, RM; Lipschultz, B; Landreman, M; Ernst, DR; Hughes, JW; Catto, PJ; Parra, FI; Hutchinson, IH; Reinke, ML; Hubbard, AE; Marmar, ES; Terry, J; Walk, JR; Alcator C-Mod Team; "Inboard and outboard radial electric field wells in the H-and I-mode pedestal of Alcator C-Mod and poloidal variations of impurity temperature" *Nuclear Fusion* **54** (8) 083017 (2014). http://dx.doi.org/10.1088/0029-5515/54/8/083017

Churchill, RM; Theiler, C; Lipschultz, B; Hutchinson, IH; Reinke, ML; Whyte, D; Hughes, JW; Catto, P; Landreman, M; Ernst, D; Chang, CS; Hager, R; Hubbard, A; Ennever, P; Walk, JR; Alcator C-Mod Team; "Poloidal asymmetries in edge transport barriers" *Physics of Plasmas* **22** (5) 056104 (2015). http://dx.doi.org/10.1063/1.4918353

Pedestal modification by auxiliary means

Injecting Lower Hybrid Range of Frequency (LHRF) waves into Alcator C-Mod's high-density H-mode plasmas has led to enhanced global energy confinement by increasing pedestal temperature and pressure gradients, decreasing the separatrix density, modifying the pedestal radial electric field and rotation, and decreasing edge turbulence. The LHRF power appears to be deposited in plasma boundary region, with a large fraction of the injected power increment appearing promptly on the outer divertor target. There is no evidence that the LH waves are driving current in these plasmas. The LHRF-actuated improvements are well correlated with suppressed pedestal density fluctuations in the 100–300 kHz range. There is also a correlation between the improved confinement and a drop in separatrix density, a correlation that is consistent with previous H-mode results with no LHRF.

Terry, JL; Reinke, ML; Hughes, JW; LaBombard, B; Theiler, C; Wallace, GM; Baek, SG; Brunner, D; Churchill, RM; Edlund, E; Ennever, P; Faust, I; Golfinopoulos, T; Greenwald, M; Hubbard, AE: Irby, J; Lin, Y; Parker, RR; Rice, JE; Shiraiwa, S; Walk, JR; Wukitch, SJ; Xu, P; C-Mod Team; "Improved confinement in high-density H-modes via modification of the plasma boundary with lower hybrid waves" *Physics of Plasmas* **22** (5) 056114 (2015). http://dx.doi.org/10.1063/1.4920964

Boundary Plasma Research

As summarized in the 2014 review of Alcator C-Mod research, "20 years of research on the Alcator C-Mod tokamak", M. Greenwald *et al.*, Phys. Plasmas 21 (2014) 110501 [1], boundary plasma research on Alcator C-Mod has been highly successful; it has uncovered key edge and divertor physics phenomena in reactor-relevant regimes, pioneered divertor research in preparation for ITER and produced seminal results and insights in many areas. Alcator C-Mod experiments performed more recently (FY14, FY15 and FY16) have continued to produce high quality data and high impact results, and through on-going analysis, will likely produce much more. This section briefly summarizes research activities and key results that have been obtained as a result of experiments performed during the last three years of C-Mod operations and from subsequent and on-going data analyses.

Scrape-off Layer Heat Flux Widths

The physics that controls the scrape-off layer heat flux widths under a variety of conditions (H-mode, L-mode, I-mode, inner-wall limited L-mode) was a major research thrust for Alcator C-Mod during the FY14-FY16 run campaigns. Experiments made use of the extensive suite of divertor heat flux diagnostics, originally developed to support the 2010 Joint Research Target [2], combined with new high-resolution divertor 'Rail probe' diagnostic [3], a new method for direct feedback control of divertor nitrogen seeding [4], and exploiting the newly developed Mirror Langmuir Probe (MLP) technique [5] coupled with an advanced, self-adaptive, scanning probe driver [6]. The research was targeted to address an ITER urgent need to understand heat flux widths in inner-wall limited startup plasmas (2014), support the 2017 Joint Research Target on dissipative and advanced divertor research and to extend the heat flux width database to poloidal magnetic fields above 1.2 tesla.

Inner Wall Limited SOL physics

Support of ITER urgent need [7]

The inboard limiters for ITER were initially designed on the assumption that the parallel heat flux density in the scrape-off layer (SOL) could be approximated by a single exponential with decay length λ_q. This assumption was found not to be adequate in 2012, when infra-red (IR) thermography measurements on the inner column during JET limiter discharges clearly revealed the presence of a narrow heat flux channel adjacent to the last closed flux surface. A multi-machine study involving the C-Mod, COMPASS, DIII-D and TCV tokamaks, employing inner wall IR measurements and/or inner wall reciprocating probes, was initiated to investigate the narrow limiter SOL heat flux channel. Alcator C-Mod contributed key data to this effort [7-9], utilizing its new MLP scanning probe system to provide high-resolution SOL profile measurements.

SOL Turbulence Simulations

In addition to providing information on heat flux widths, a wealth of SOL turbulence data were obtained from MLP and gas-puff imaging (GPI) diagnostics during this study of inner-wall limited plasmas. These have proven extremely valuable to test first-principles plasma turbulence simulation codes. Turbulence simulations of these C-Mod discharges were performed by collaborators at the Swiss Plasma Center using the GBS code [10], examining the role of ExB flow shear and by Dartmouth collaborations [11] using the GBD code. Most recently, there is strong interest in using these data to performing validation studies of the newly developed gyrokinetic Gkeyll code (Greg Hammett).

Heat Flux Widths at High Poloidal Magnetic Field; 2017 JRT

A major focus of the final experimental campaigns on Alcator C-Mod was to characterize the heat flux width, λ_q, over a wide range of conditions, utilizing a unique array of heat flux sensors with unprecedented spatial resolution and heat flux dynamic range. Analysis of these data was performed in part to support the 2017 Joint Research Target. A major finding is that the inverse poloidal heat flux width scaling was found to extend up to Bp~1.3 T in H-mode. These findings will be reported at the 2018 Plasma Surface Interaction Conference as well as published in Nuclear Fusion. These data will also be shared with modelers to test first-principles turbulence code predictions, such as from the XGC1 and BOUT++ simulation codes, extending work that has been done previously [12, 13]. Another area of focus was an examination of the power sharing among divertors as the magnetic topology is varied from single-null to balanced double null [14]. It was found that power sharing amongst the outer (upper versus lower) and inner (upper versus lower) pairs of divertors can be described in terms of a logistic function of magnetic flux balance, consistent with heat flux mapping along magnetic field lines to the outer midplane. The overall behavior of H-modes operated near double null and for I-modes operating to within one heat flux e-folding of double null were found similar to Ohmic L-modes, with a significant reduction of power on the inner divertor legs. In addition, heat flux footprints and power e-folding widths, λ_q, on the inner divertor in I-modes were explored in I-modes, and will be reported at the upcoming 2018 Plasma Surface Interaction Conference. It is found that these λ_q are slightly larger than those obtained on the outer divertor but similarly tend to follow an inverse scaling with poloidal magnetic field strength.

Influence of Divertor N_2 Seeding on SOL Heat Flux Widths; 2017 JRT

The effect of divertor nitrogen seeding on scrape-off layer heat flux widths was explored during the FY15 and FY16 run campaigns making use of a new feedback control technique to inject nitrogen in the C-Mod divertor [4]. Data analysis was performed as part of the 2017 JRT and will be reported at the upcoming 2018 Plasma Surface Interaction Conference. It is found that the SOL power e-folding width is robustly insensitive to divertor conditions, spanning the range of sheath-limited to high-recycling to near detached conditions with parallel at the divertor target varying by a factor of ~10. These results challenge the idea that divertor conditions affect plasma turbulence and transport 'upstream' (and thus λ_q) and have important implications for the use of advanced divertor configurations, such a long-leg divertors.

Diagnostic Development

The seminal results from Alcator C-Mod were made possible in large part due to the development and use of advanced plasma diagnostics. The Alcator team has continued and is still continuing to make fundamental contributions in this area, as highlighted by in following research reports.

Multispectral imaging – tests on C-Mod, deployment on TCV [15]

The goal of Multi-Spectral Imaging (MSI) is to capture simultaneous spectrally filtered images from a common sight view (e.g. divertor region) while maintaining a large etendue and high spatial resolution. A four-wavelength system was successfully installed and tested on Alcator C-Mod and is presently relocated to TCV for further development and for divertor physics experiments.

Divertor "Rail" Langmuir Probes [3, 16]

An array of flush-mounted and toroidally elongated Langmuir probes (rail probes) was specifically designed for the Alcator C-Mod's vertical target plate divertor and operated over multiple campaigns. The new rail probes provide unprecedented probe-based coverage of the divertor target. They successfully operated during C-Mod's FY2015 and FY2016 experimental campaigns with no evidence of damage, despite being regularly subjected to heat flux densities parallel to the magnetic field exceeding ~1 GW m^{-2} for short periods of time. Sheath expansion effects typically associated with flush probes were successfully mitigated by the rail design, extending the use of these Langmuir probes to incident magnetic field line angles as low as 0.5°.

Experimental Test of Secondary Electron Emission Models [17]

Plasma potentials computed from Langmuir probe data rely on a method to account for secondary electron emission (SEE) from the electrodes. However, significant variations exist among published models for SEE and the reported experimental parameters used to evaluate them. As a means to critically assess SEE computation methods, two of four tungsten electrodes on a Langmuir–Mach probe head were replaced with molybdenum and exposed to Alcator C-Mod boundary plasmas where electron temperatures exceed 50 eV and SEE becomes significant. Of six methods used to compute SEE, only two are found to produce consistent results (Sternglass model with Bronstein experimental parameters and Young–Dekker model with Bronstein experimental parameters). This information has proven essential for an accurate computation of turbulence-induced transport using the Mirror Langmuir Probe (MLP) diagnostic.

Self-Adaptive Servomotor Scanning Probe Drive [6]

A new servomotor drive system was developed for the horizontal reciprocating probe on Alcator C-Mod. Real-time measurements of plasma temperature and density—through use of a mirror Langmuir probe bias system—combined with a commercial linear servomotor and controller enable self-adaptive position control. Probe surface temperature and its rate of change were computed in real time and used to control probe insertion depth. It was found that a universal trigger threshold can be defined in terms of these two parameters; if the probe is triggered to retract when crossing the trigger threshold, it will reach the same ultimate surface temperature, independent of velocity, acceleration, or scrape-off layer heat flux scale length. In addition to controlling the probe motion, the controller can be used to monitor and control all aspects of the integrated probe drive system.

Diagnostic Review papers

The Alcator Team has contributed to a number of diagnostic review papers, as highlighted below.

Impurity Spectroscopy [18]

New techniques that attempt to more fully exploit spectroscopic diagnostics in the divertor and pedestal region during highly dissipative scenarios were demonstrated using experimental results from recent low-Z seeding experiments on Alcator C-Mod, JET and ASDEX Upgrade. Radiation enhancement for nitrogen is shown to arise primarily from changes in Li- and Be-like charge states on open field lines, but also through transport-driven enhancement of H- and He-like charge states in the pedestal region. Examples from JET

and Alcator C-Mod experiments which employ nitrogen seeding highlight how improving spectroscopic coverage can be used to gain empirical insight and provide more data to validate boundary simulations.

Diagnostic Tools for Divertor Detachment [19]

Key aspects of divertor detachment that are addressed by bolometry, impurity spectroscopy, hydrogen spectroscopy, and measurements of divertor target heat-flux were reviewed including feedback control of detachment using some of these diagnostics as the 'sensors'. Challenges and some future directions for these diagnostics in the context of studying divertor detachment were identified.

Gas Puff Imaging Diagnostic Review [20]

This paper reviews gas puff imaging diagnostics of edge plasma turbulence in magnetic fusion research, including 10 GPI systems implemented over the past <15 years. Comparison of GPI results with other edge turbulence diagnostic results is described, and the many common features observed. Several issues in the interpretation of GPI measurements are discussed, and potential improvements in hardware and modeling are suggested.

Real Time Feedback-Controlled Divertor N_2 Seeding Using Surface Thermocouples [4]

Mitigation of the intense heat flux to the divertor is one of the outstanding problems in fusion energy. One technique that has shown promise is impurity seeding, i.e., the injection of low-Z gaseous impurities (typically N_2 or Ne) to radiate and dissipate the power before it arrives to the divertor target plate. To this end, the Alcator C-Mod team created a first-of-its-kind feedback system to control the injection of seed gas based on real-time surface heat flux measurements. Surface thermocouples provide real-time measurements of the surface temperature response to the plasma heat flux. The surface temperature measurements are inputted into an analog computer that “solves” the 1-D heat transport equation to deliver accurate, real-time signals of the surface heat flux. The surface heat flux signals are sent to the C-Mod digital plasma control system, which uses a proportional–integral–derivative (PID) algorithm to control the duty cycle demand to a pulse width modulated piezo valve, which in turn controls the injection of gas into the private flux region of the C-Mod divertor.

Mirror Langmuir Probe (MLP) Diagnostic Development and Investigation of the Quasi-Coherent Mode [5]

A new “Mirror Langmuir Probe” diagnostic [21], combined with a double-coil scanning magnetic probe, was used to interrogate Alcator C-Mod's quasi-coherent mode (QCM) with unprecedented detail. In ohmic EDA H-modes, the QCM was found to reside in a region of positive radial electric field, with a radial width (<3 mm) that spans open and closed field line regions. Large amplitude, in-phase sinusoidal bursts (<100 kHz) in density, electron temperature, and plasma potential are observed, with potential lagging density by <16°, producing an outward radial transport velocity of <10 m/s. Mode propagation corresponds to the sum of local E × B and electron diamagnetic drift velocities. Poloidal magnetic field fluctuations project to current filaments carrying peak current densities of <25 A cm^{-2}. An evaluation of parallel electron force balance (Ohm's law) over a fluctuation cycle indicates a significant electromotive

component. Interchange drive is also a contributor in the current continuity (vorticity) equation. Thus, the QCM is identified as being primarily a separatrix-spanning electron drift-wave with interchange and electromagnetic contributions.

SOL Turbulence, Transport and Modeling

SOL Plasma Fluctuations Statistical Analyses

The Alcator C-Mod team has had a very productive collaboration with the plasma physics group at the Arctic University of Norway, Tromsø , headed by Odd Erik Garcia. The four following papers highlight results obtain from analysis of recent C-Mod data.

Comparison of SOL Plasma Fluctuations in Different Confinement Regimes [22]

A remarkable similarity of the fluctuation statistics in ohmic plasmas and in edge localized mode-free and enhanced D-alpha high confinement mode plasmas is found. In all cases investigated, the time series of emission from a single spatially resolved view into the gas puff provided by the GPI diagnostic are dominated by large-amplitude bursts, attributed to blob-like filament structures moving radially outwards and poloidally. Conditionally averaged waveforms have a two-sided exponential shape with comparable temporal scales and asymmetry, while the burst amplitudes and the waiting times between them are exponentially distributed. These results provide strong evidence in support of a stochastic model describing the plasma fluctuations in the scrape-off layer as a super-position of uncorrelated exponential pulses.

Analysis of SOL Electron Temperature Fluctuations [23]

A statistical analysis of one second long time series of electron density, temperature, radial electric drift velocity and the corresponding particle and electron heat fluxes in the far scrape-off layer is performed. The electron density and temperature are found to be strongly correlated and feature fluctuation statistics similar to those of the ion saturation current. Both electron density and temperature time series are dominated by intermittent, large-amplitude bursts with an exponential distribution of both burst amplitudes and waiting times between them. Describing these time series as a superposition of uncorrelated exponential pulses, we find that probability distribution functions, power spectral densities as well as auto-correlation functions of the data time series agree well with predictions from the stochastic model.

Relationship Between Frequency Power Spectra and Intermittent, Large-Amplitude Bursts [24]

Fluctuations in the boundary region of the Alcator C-Mod tokamak were analyzed using gas puff imaging data from a set of Ohmically heated plasma density scan experiments. It was found that the relative fluctuation amplitudes are modest and close to normally distributed at the separatrix but become increasingly larger and skewed towards the main chamber wall. The frequency power spectra are nevertheless similar for all radial positions and line-averaged densities. Predictions of a stochastic model, describing the plasma fluctuations as a super-position of uncorrelated pulses, are shown to be in excellent agreement with the measurements. This implies that the pulse duration is the same, while the degree of pulse overlap decreases radially outwards in the scrape-off layer.

Comparison of SOL and Divertor Fluctuation Statistics [25]

Long time series of the ion saturation current and floating potential are examined, sampled by Langmuir probes dwelled in the outboard mid-plane scrape-off layer and embedded in the lower divertor baffle of Alcator C-Mod. A series of ohmically heated L-mode plasma discharges is investigated with line-averaged plasma density ranging from n/nG=0.15 to 0.42, where nG is the Greenwald density. All ion saturation current time series that are sampled in the far scrape-off layer are characterized by large-amplitude burst events. Histograms of the ion saturation current time series are found to agree well with a prediction of a stochastic model for the particle density fluctuations in scrape-off layer plasmas. Conditional averaging reveals that the radial blob velocity, estimated from floating potential measurements, increases with the normalized burst amplitude in the outboard mid-plane scrape-off layer. For low density discharges, the conditionally averaged waveform of the floating potential associated with large amplitude bursts at the divertor probes has a dipolar shape. In detached divertor conditions the average waveform is random, indicating electrical disconnection of blobs from the sheaths at the divertor targets.

Turbulence Imaging of Filaments Near the X-point [26]

A rich variety of field-aligned fluctuations has been revealed using fast imaging of D_α emission from Alcator C-Mod's lower X-point region. Field-aligned filamentary fluctuations were observed along the inner divertor leg, within the Private-Flux-Zone (PFZ), in the Scrape-Off Layer (SOL) outside the outer divertor leg, and, under some conditions, at or above the X-point. The locations and dynamics of the filaments in these regions are strikingly complex in C-Mod. Changes in the filaments' generation appear to be ordered by plasma density and magnetic configuration. Filaments are not observed for plasmas with n/nGreenwald $\lesssim$ 0.12 nor are they observed in Upper Single Null configurations. In a Lower Single Null with 0.12 $\lesssim$ n/nGreenwald $\lesssim$ 0.45 and Bx∇B directed down, filaments typically move up the inner divertor leg toward the X-point. Reversing the field direction results in the appearance of filaments outside of the outer divertor leg. With the divertor targets "detached", filaments inside the LCFS are seen.

Simulation of C-Mod SOL Turbulence using the SOLT Code [27]

Two-dimensional scrape-off layer turbulence (SOLT) code simulations were compared with an L-mode discharge. Density and temperature profiles for the simulations were obtained by smoothly fitting Thomson scattering and mirror Langmuir probe (MLP) data from the shot. Mean flow profiles and density fluctuation amplitudes are found consistent with those measured by MLP in the experiment and with a Fourier space diagnostic designed to measure poloidal phase velocity. It is found that neither sheared flow nor pressure gradient modification can be excluded as turbulence saturation mechanisms.

Simulation of C-Mod SOL Turbulence using the GBS Code [28]

A quantitative comparison is made between gas-puff imaging (GPI) turbulence measurements in Alcator C-Mod inner-wall limited discharges and 3D flux-driven drift-reduced Braginskii turbulence simulations of scrape-off layer dynamics. The comparison is carried out for a series of inner-wall limited discharges where the magnetic field and the density are varied. The comparison between GPI data and non-linear simulations yields overall good agreement for several observables, such as the D_α emission levels and intermittency, the radial and poloidal correlation lengths and propagation velocities, and the power and frequency spectral density.

Parallel Structure of SOL Fluctuations [29]

The parallel structure of blob filaments in the far scrape-off layer of Alcator C-Mod was investigated by combining electrostatic probe measurements with localized measurements of $D\alpha$ or He I line emission. The spatially resolved emission measurements were made in the outboard midplane region, while probes sampled fluctuations both close to the magnetic X-point and at the outer divertor target. Time-delay correlation analysis reveals that far-SOL blobs form highly elongated filaments along the ambient magnetic field from the midplane to the divertor target. Those filaments appear to be fairly unaffected by the strong magnetic shear region close to the X-point with maximum correlation amplitudes of approximately 75% between near-midplane and near-X-point fluctuations, as well as between near-midplane and divertor-target fluctuations. However, the filaments do not form at the same time everywhere within a flux tube, but appear, on average, first nearer the midplane and show diffusion along the magnetic field. This parallel propagation occurs on a time-scale that is much faster than expected from particle diffusion, but agrees with fundamental dispersion estimates.

Active Probing and Excitation of Quasi-Coherent Edge Modes with a Shoelace Antenna

Recognizing the importance of the Quasi-Coherent Mode in the regulation of the EDA H-mode pedestal and its short-wavelength ($k_\perp \sim 1.5$ cm^{-1}) electromagnetic character, the Alcator C-Mod team sought to actively probe this class of modes using a specially-designed 'shoelace antenna'. This research was very successful, both technically and scientifically, leading to a deeper understanding of the physics behind the QCM and the response of the edge plasma to external excitation. It was found that the shoelace antenna was able to excite a QCM drift wave like mode at will, either separately or in resonance with the intrinsic QCM in an H-mode plasma. These data in combination with the MLP measurements confirm that the antenna-driven mode and intrinsic mode are essentially the same fluctuation. It was also found that the intrinsic QCM is a damped mode, which means that the QCM is not in itself the manifestation of a plasma instability but rather it is weakly damped mode that can be excited by free energy in the plasma – akin to the way a QCM-like mode can be driven by the shoelace antenna.

Shoelace Antenna Matching System [30]

A wide-frequency range (50–300 kHz) power system was implemented for use with a new RF antenna – the "Shoelace" antenna – built to drive coherent plasma fluctuations in the C-Mod edge. A custom, dynamically tunable matching network allowed two commercial 1 kW, 50-Ω RF amplifiers to drive the low-impedance, inductive load presented by the antenna. At least 85% of source power was dissipated in the antenna across the operational frequency range, with a minimum frequency slew rate of 1 MHz/s; the best performance was achieved in the narrower band from 80 to 150 kHz which was of interest in typical experiments. These tools enabled first-of-a-kind measurements of the tokamak edge plasma system response in the frequency range and at the wave number at which coherent fluctuations regulate heat and particle transport through the plasma boundary.

First Time Demonstration of External Excitation of QCM-like Mode [31]

A novel "Shoelace" antenna was used to inductively excite a short-wavelength edge fluctuation in a tokamak boundary layer for the first time. The principal design parameters, $k_\perp$=1.5±0.1 cm^{-1} and

45<f<300 kHz, match the Quasi-Coherent Mode (QCM, $k_\perp$<1.5 cm^{-1}, f<50−150 kHz) in Alcator C-Mod, responsible for exhausting impurities in the steady-state, ELM-free Enhanced D_α H-mode. In H-mode, whether or not there is a QCM, the antenna drives coherent, field-aligned perturbations in density and poloidal field, which are guided by field lines, propagate in the electron diamagnetic drift direction, and exhibit a weakly damped resonance near the natural QCM frequency. This result is significant, offering the possibility that externally driven modes may be used to enhance particle transport. In L-mode, the antenna drives only a non-resonant magnetic field response.

Edge Transport of a QCM-like Fluctuation Driven by the Shoelace Antenna [32]

In 2016, the Shoelace antenna was relocated to enable direct measurements of driven transport by a reciprocating Mirror Langmuir Probe, while also making available gas puff imaging and reflectometer data to provide additional radial localization of the driven fluctuation. This new data suggests a ~4 mm-wide mode layer centered on or just outside the separatrix. Fluctuations coherent with the antenna produced a radial electron flux with Γ/n ~ 4 m s^{-1} in EDA H-mode, smaller than but comparable to the QCM level. But in transient ELM-free H-mode, Γ/n was an order of magnitude smaller, and driven fluctuations reduced by a factor of ~ 3. The driven mode is quantitatively similar to the intrinsic QCM across measured spectral quantities, except that it is more coherent and weaker. This work informs the prospect of achieving control of edge transport by direct coupling to edge modes, as well as the use of such active coupling for diagnostic purposes.

Validation of SOLPS-ITER Code

As part of a collaborative effort to validate the edge plasma model in the SOLPS-ITER code suite under ITER-relevant divertor plasma and neutral conditions, modeling of some specific Alcator C-Mod divertor plasmas were undertaken with this new code [33]. Simulations were performed with a complete drifts model and kinetic neutrals, including effects of neutral viscosity, ion-molecule collisions and Ly α -opaque conditions, but assuming a pure deuterium plasma. Through a series of simulations with varying divertor geometries, the importance was highlighted of including neutral leakage paths through the divertor substructure on the divertor plasma solution. The impact of drifts on inner-outer target asymmetries as additionally assessed. Including both effects, excellent agreement between simulations and upstream and outer target Langmuir Probe data was obtained. In absence of strong volumetric losses due to e.g. impurity radiation in the simulations, the strong inner target detachment observed experimentally still remains elusive to the modeling at present.

Toroidally Localized Divertor Impurity Seeding

Motivated by an ITER urgent need to determine the number of gas injectors required for divertor impurity seeding, Alcator C-Mod undertook a series of experiments to examine the response of the divertor plasma to toroidally localized injections. Results from these experiments and subsequent modeling efforts are described below.

Non-Axisymmetric Divertor Seeding Experiments [34]

Experiments on Alcator C-Mod were performed to investigate the impact of toroidally localized impurity injection on H-mode exhaust scenarios to help inform sub-divertor gas injector designs for ITER. In repeated EDA H-modes, the amount of N_2 injected into the private flux region was scanned up to levels which strongly impacted normalized energy confinement, H98, and led to an H/L back-transition. Repeated scans increased the toroidal peaking of the gas injection, reducing from five equally spaced locations to a single toroidal and poloidal injector. Results show the impact on the pedestal and core plasma is similar between all cases as long as the total gas injection rate is held constant.

Modeling of Non-Axisymmetric Divertor Seeding with EMC3-EIRENE [35]

Experiments on Alcator C-Mod with toroidally and poloidally localized divertor nitrogen injection were modeled using the three-dimensional edge transport code EMC3-EIRENE. In these experiments five toroidally distributed gas injectors in the private flux region were sequentially activated in separate discharges resulting in clear evidence of toroidal asymmetries in radiated power and nitrogen line emission as well as a $<$50% toroidal modulation in electron pressure at the divertor target. The pressure modulation is qualitatively reproduced by the modeling, with the simulation yielding a toroidal asymmetry in the heat flow to the outer strike point. Toroidal variation in impurity line emission is qualitatively matched in the scrape-off layer above the strike point, however kinetic corrections and cross-field drifts are likely required to quantitatively reproduce impurity behavior in the private flux region and electron temperatures and densities directly in front of the target

Modeling of high-power enhanced D-alpha H-mode plasmas subjected to Non-Axisymmetric Divertor Seeding [36]

Experiments in Alcator C-Mod to assess the level of toroidal asymmetry in divertor conditions resulting from poloidally and toroidally localized extrinsic impurity gas seeding showed a weak toroidal peaking ($<$1.1) in divertor electron temperatures for high-power enhanced D-alpha H-mode plasmas. This is in contrast to similar experiments in Ohmically heated L-mode plasmas, which showed a clear toroidal modulation in the divertor electron temperature. Modeling of these experiments using the 3D edge transport code EMC3-EIRENE qualitatively reproduced these trends, and indicates that the different response in the simulations is due to the ionization location of the injected nitrogen. Low electron temperatures in the private flux region (PFR) in L-mode result in a PFR plasma that is nearly transparent to neutral nitrogen, while in H-mode the impurities are ionized in close proximity to the injection location, with this latter case yielding a largely axisymmetric radiation pattern in the scrape-off-layer.

Examining the Limitation of Feedback Controlled Divertor Seeding

Making use of the new feedback system to measure and control surface heat flux in real-time [4], the Alcator team sought to test this tool with an eye towards its application for a reactor [37]. While the

system was found to work quite well under relatively steady conditions, use of it during transients revealed important limitations on feedback control of impurity seeding in conventional vertical target plate divertors. In some cases, the system was unable to avoid plasma reattachment to the divertor plate or the formation of a confinement-damaging x-point MARFE. This was due to the small operational window for mitigated heat flux in the parameters of incident plasma heat flux, plasma density, and impurity density as well as the relatively slow response of the impurity gas injection system compared to plasma transients. Given the severe consequences for failure of such a system to operate reliably in a reactor, these results highlight that the conventional vertical target plate divertor is not likely to provide an adequately controllable system in reactor-class devices. These considerations motivate the need to develop passively stable, highly compliant divertor configurations and experimental facilities that can test such possible solutions.

Long Leg Divertor Physics

Recognizing the limitations of the conventional vertical target divertor for feedback control of divertor heat fluxes and the severity of the power exhaust problem, as encapsulated in the Eich scaling for λ_q, the C-Mod boundary physics team sought to explore advanced divertor geometries that might solve both challenges and to devise an experiment that would be able to test their applicability for a reactor in regimes that are relevant (e.g., heat flux densities, plasma pressures, magnetic fields expected for a reactor). To this end, the team invented the X-point target divertor concept (XPTD), proposed an experiment (ADX) to test this and other advanced divertors and formed a divertor modeling working group with LLNL and U. York to perform long-leg divertor modeling for XPTD concept and other schemes under the plasma conditions projected for ADX and for the ARC fusion pilot plant.

Invention of X-point target divertor and the ADX tokamak [38]

The MIT Plasma Science and Fusion Center and collaborators proposed a high-performance Advanced Divertor and RF tokamak eXperiment (ADX) to test innovative divertor ideas, including an 'X-point target divertor' concept, at the required performance parameters while simultaneously producing high-performance core plasma conditions that are prototypical of a reactor: equilibrated and strongly coupled electrons and ions, regimes with low or no torque, and no fuelling from external heating and current drive systems. Equally important, the experimental platform was designed to test innovative concepts for lower hybrid current drive and ion cyclotron range of frequency actuators with the unprecedented ability to deploy launch structures both on the low-magnetic-field side and the high-magnetic-field side. Such an integrated demonstration of high-performance core-divertor operation with steady-state sustainment was seen as a necessary step towards an attractive pilot plant, as envisioned in the ARC reactor concept that makes use of high-temperature superconductor technology.

Attainment of Stable Detachment Front in Long-Leg Divertor Study [39] [40]

A study of long-legged tokamak divertor configurations was performed with the edge transport code UEDGE with model parameters based on the ADX tokamak concept. Several long-legged divertor

configurations were considered, in particular the X-point target configuration, and compared with a standard divertor. For otherwise identical conditions, a scan of the power entering the boundary from the core plasma was performed. It was found that for the studied parameters, the operation window for a detached divertor in the standard divertor configuration was very small, or even non-existent; under the same conditions for long-legged divertors the detached operation window is quite large, in particular for the X-point target configuration, allowing a factor of 5–10 variation in the input power. These modeling results pointed to possibility of stable fully detached divertor operation for a tokamak with extended divertor legs.

Modeling of Long-Leg Divertors for ARC [41]

Simulations of the ARC scrape-off layer and divertor configuration were carried out using UEDGE to perform the first power-handling assessment for the divertor design. A convective–diffusive anomalous transport model was implemented in the code to reproduce the radial plasma profiles anticipated for the device at the outer mid-plane. Levels of exhaust power from the core are varied, and a 0.5% fixed fraction neon impurity seeding was included in investigations to find steady state detached solutions. Initial studies employing a super-X divertor configuration showed that a stable detached divertor-operational window exists for reactor exhaust powers in the range of 72–92 MW, which is close to projected levels of exhaust power of 105 MW across the separatrix anticipated for ARC. Under these conditions, the divertor heat flux is fully dissipated by radiation and radial losses to the sidewalls of the divertor channel, leading to acceptable levels of power flux density on plasma-facing components. Simulations are presently being extended to study the performance of the X-point target geometry and to explore the sensitivity to the physics model and input parameters.

Scrape-off Layer Impurity Screening

It is well recognized that robust physics and technology solutions to control plasma-material interactions (PMI) on main-chamber components, including RF actuators, must be demonstrated in order to develop credible designs for steady-state, electricity generating fusion reactors. One promising approach is to locate all RF actuators and close-fitting wall structures on the *high-field side* (HFS) of the tokamak and operate with near-double null magnetic configurations [38, 42-45]. Among other things, the impurity screening characteristics of the HFS was thought to be excellent, based on previous experiments in single-null magnetic configurations [46]. Motivated by this vision, the impurity screening response of the high-field side (HFS) scrape-off layer (SOL) to localized nitrogen injection is investigated on Alcator C-Mod during the 2015 and 2016 run campaigns for magnetic equilibria spanning lower-single-null, double-null and upper-single-null configurations under otherwise identical plasma conditions [47, 48]. L-mode, EDA H-mode and I-mode discharges were investigated. HFS impurity screening is found to depend on magnetic flux balance and the direction of B×Grad B relative to the most active divertor. Impurity 'plume' emission patterns indicate that both parallel and perpendicular (E× B) flows in the SOL contribute to the 'flushing' of impurities towards the active divertor, thereby affecting the overall impurity screening behavior. Despite the fact that the HFS SOL is extremely narrow in near-double-null configurations, this SOL is able to screen locally injected nitrogen at least as effectively as the low-field side (LFS) SOL—up to a factor of 10 more effective, depending on specific plasma conditions and whether the magnetic geometry produces parallel flows that work with or against E×B flows. For situations in which the E×B drift of the impurity ions

opposes parallel flow toward the primary divertor, HFS impurity screening is found to be least effective. When E×B drifts assist parallel flow toward the primary divertor, HFS impurity screening is found to be very effective. These data support the idea of placing RF actuators and close-fitting wall components on the HFS of the tokamak. With this configuration, near-double-null magnetic topologies may be used for active control of plasma parameters at the antenna/plasma interface for optimal RF coupling, mitigate the generation of local impurities from plasma–material interactions and, taking advantage of favorable plasma flows and good screening properties of the HFS SOL, further minimize the impact of wall-born impurity sources on the plasma core.

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Disruption Studies and Machine Learning

The study of the threshold electric field to generate relativistic runaway electrons (RE's) on C-Mod revealed that synchrotron emission was a major energy loss mechanism on C-Mod. This is a consequence of Alcator C-Mod's high magnetic field, which also results in the RE synchrotron radiation being emitted strongly in the visible wavelength range. Absolutely-calibrated spectrometers, distortion-corrected cameras, and the Motional Stark Effect (MSE) diagnostic have been used to measure synchrotron spectra, images, and polarization information, respectively. The new synthetic diagnostic SOFT [Hoppe2018] has been used to simulate all three measurements, with the first work on C-Mod images published in [Hoppe2018] and the most complete work on spectra published in [Tinguely2018a]. Spectra were measured at three magnetic fields (2.7, 5.4, and 7.8 T), and a test particle model of RE energy and density was input into SOFT to reproduce experimental data. The data were consistent with RE energies decreasing as magnetic field was increased, motivating further exploration of high-field tokamaks.

In Alcator C-Mod triggered vertical displacement events, plasmas moved downward and contact the first wall. Halo currents were measured with a set of outboard divertor Langmuir "rail" probes, which have high poloidal resolution (~1 cm spacing), while still having a large collection area. The plasma contact point on the divertor plate and its downward motion were clearly seen from positive and negative currents measured. Magnetic reconstructions of the plasma boundary matched probe data and were used to calculate the edge safety factor, which was found to decrease to approximately rational values (~1 and 3/2) before disruption. Finally, from reproduced VDEs, the halo region temperature was estimated to be ~35-60 eV, which is consistent with previous simulations and can guide future ones [Tinguely2018b].

In recent years, there has been a concerted effort to establish disruption databases for C-Mod and other tokamaks, and to apply artificial intelligence to develop disruption prediction capability by training machine learning algorithms on these databases. During the past year, our machine learning activities have focused specifically on: 1) training and testing AI algorithms for disruption prediction using several of our tokamak databases; 2) installing and operating a trained disruption prediction algorithm in the DIII-D real time plasma control system; and 3) expanding our multi-machine databases.

We have been extensively developing disruption prediction algorithms based on an AI method known as Random Forests, and trained on our C-Mod, DIII-D, and EAST databases. We are finding that the plasma parameters that are most relevant for disruption prediction are different on the different machines. Furthermore, the prediction success rates for Random Forests trained on each machine database varies significantly. The details of this work will be presented at the upcoming IAEA conference. We have just started training recurrent neural networks (RNNs) on the EAST database. RNNs have the ability to incorporate information from past times when classifying the disruption probability at the current time.

A trained Random Forest algorithm was painstakingly adapted, installed, and run in real time in the DIII-D plasma control system (PCS) [Rea2018a]. This technical work required extensive help

from DIII-D PCS experts to set up two-way communication interfaces and protocols between the PCS and our software. Our disruption prediction algorithm ran on about 400 discharges, right up until the end of DIII-D's current run campaign. We are encouraged by our algorithm's prediction performance, as well as its computational speed, and we are currently analyzing the results in detail.

Last July DoE requested that we start a collaboration with Korea's NRFI to begin developing and populating a database of disruption-relevant parameters for KSTAR, to complement our existing databases on Alcator C-Mod, DIII-D, and EAST. This is synergistic with our goal of determining whether or not a reliable universal disruption warning algorithm can be developed for ITER and future reactors based on today's operating tokamaks [Rea2018b].

A Machine Learning Working group was started at the PSFC in Dec 2017. The mission of the working group is to foster the application of machine learning tools to plasma research, independently of the physics domain and to provide a platform to share such data-driven methodological approaches, thus guaranteeing much broader collaborations.

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MDSPlus

MDSplus is the *de facto* standard for data acquisition and data management in the U.S. fusion program, in use at all of its major facilities, and is used as well for many international sites important for U.S. collaboration including W7X, EAST, KSTAR, AUG, JET and TCV. It serves as the underlying data archive and management system for the plasma control systems for many fusion experiments around the world. It is currently installed at over 30 sites spread over 4 continents. Prior to FY14 MDSplus was largely developed and supported through the Alcator C-Mod operations and research budget. In FY14, the funding moved to an independent DOE grant.

MDSplus is a set of software tools for data acquisition and storage and a methodology for management of complex scientific data. It allows all data from experiments, analysis or simulation codes to be stored into a single, self-descriptive, hierarchical structure. The system includes a data-driven workflow engine, which can be used to run timing and data acquisition systems during an experimental shot and to schedule pre-pulse initialization and post-pulse data analysis. The system continues to evolve based on user requirements.

Led by staff at the Massachusetts Institute of Technology, MDSplus was developed jointly with the Fusion Research Group in Padua, Italy (Istituto Gas Ionizzati and Consorzio RFX), and the Los Alamos National Lab. MDSplus is the most widely used system for data management in the magnetic fusion energy program. Total development investment to date has been more than 55 man-years (of which ~33 have been at MIT). A partial list of sites and facilities using MDSplus is included in Appendix 6. Though not actively “marketed” outside of fusion, MDSplus has found application in diverse fields, for example bio-medical imaging or space propulsion.

MDSplus was designed to give researchers the ability to produce complete, coherent, self-descriptive data sets and to provide tools for efficient access to that data in a distributed computing environment. The result was a system with sufficient flexibility and extensibility such that all information associated with an experiment (or simulation) can be stored in the same structure and accessed through the same set of simple calls. By unifying setup, calibration, geometry and so forth with task descriptions, scheduling, status and all raw and processed data, MDSplus makes it easy to share data and tools across applications, facilitating collaborative research and reducing duplication of efforts. Interfaces are provided that allow MDSplus data to be written or read in a large number of programming languages currently including fortran, c , c++ , java , javascript, idl, matlab, visual basic, labview, php and python. Remote access through a client-server model was a an early innovation and enabled secure remote data access and the first demonstration of full remote control of a fusion experiment. Recent enhancements enable MDSplus to record data for steady-state or very long pulse experiments. Though initially designed for experiments, modelers have also found MDSplus to be a useful as an API (Application Programming Interface) and for archiving code inputs and outputs in coherent, self-descriptive data structures.

First developed over 25 years ago, MDSplus is built on a conceptual framework that translates well to newer programming and data management paradigms. For example, data can be accessed via globally unique data names, analogous to the way that web pages are located in the World Wide Web via a URL. Thus data can be retrieved from multiple sites, in the same application, without any ambiguity as to which data items have been specified. This makes web-based tools particularly straightforward. Users

have no need to understand underlying file or storage mechanisms, they need only specify a data name in the MDSplus Application Programming Interface (API). Data access is implemented as a service, similar to approaches used in Service Oriented Architectures (SOA). MDSplus is “data-centric” with complex applications orchestrated through communication with the data archive. Finally, MDSplus has many object-oriented features – these are explicitly exposed in the recently implemented python, c++, java, and matlab interfaces.

2.1 Comparison With Other Data Standards

As noted above, MDSplus is not simply a data standard as it provides support for data acquisition, task description, scheduling and dispatching, asynchronous event generation and distribution, etc. However, MDSplus is a highly capable data storage and management system with a unique combination of features and functions including:

- A rich set of simple and composite data types
- Hierarchical structure
- Self-descriptive - "metadata" included with each data item
- Expression evaluation, enabling "indirect" reference to data
- Lossless data compression and decompression
- Remote access via client/server model
- Service vs file oriented - "logical" rather than "physical" data access
- Extensible
- Scalable to very large and complex data sets including continuous input
- Support for many concurrent readers **and** writers (particularly important for run-time data access in fusion experiments)

History of MDSplus supported facilities

Site	Experiment	Year Adopted
MIT, Cambridge, MA	C-Mod	1991
MIT, Cambridge, MA	LDX	2001
CNR, Padova, Italy	RFX	1991
CNR, Padova, Italy	SPIDER (ITER neutral beam test facility)	2011
EPFL, Lausanne, Switzerland	TCV	1992
EPFL, Lausanne, Switzerland	TORPEX	2001
EPFL, Lausanne, Switzerland	GT-170 (ITER gyrotron development facility)	2007

Taejeon, South Korea	KSTAR	1996
General Atomics, San Diego, CA	DIII-D	1997
PPPL, Princeton, NJ	NSTX, NSTX-U	1997
PPPL, Princeton, NJ	LTX	2007
Max-Planck-Institute for Plasma Physics,Garching, Germany	ASDEX Upgrade	2002
Max-Planck-Institute for Plasma Physics,Greifswald, Germany	W7X	2015
Chinese Academy of Sciences. Hefei China	EAST	2010
U of Washington, Seattle, WA	HIT-SI	1998
U of Washington, Seattle, WA	ZaP	1998
U of Washington, Seattle, WA	RPPL	1998
U of Washington, Seattle, WA	TIP	1998
U of Washington, Seattle, WA	WATCS	2001
ANU, Canberra, Australia	H1	1999
Frascati,Italy	FTU	1999
EFDA	JET	2000
Tianjin University of China,	PRCHT-7U	2000
NIFS, Tajimi, Japan	CHS	2000
UCSD, San Diego, CA	PISCES	2000
SAIC, San Diego, CA	NIMROD	2000
Columbia U, NY, NY	HBT-EP	2000
Columbia U, NY, NY	CTX	2001
Kurchatov Institute, Moscow, Russia	T-10	2001
LANL, Los Alamos, NM	FRX-L	2001
LBL/NERSC, Oakland, CA	NIMROD	2001
U of Wisconsin, Madison, WI	MST	2001
U of Wisconsin, Madison, WI	Pegasus Toroidal Exp	2006

U of Wisconsin, Madison, WI	Rotating wall experiment	2006
Institute for Plasma Research, India	ADITYA	2004
Nasa, Huntsville, AL	Marshal Space Flight Center	2005
Ad Astra Rocket, Houston, TX	VASIMR	2005
Ad Astra Rocket, Houston,TX	VX-200	2007
Ad Astra Rocket Company Costa Rica	VX-CR VASIMR engine experiment	2007
University of Sao Paulo, Brazil	TCABR	2010
Tri Alpha Energy	C2	2007
Berndorf Band, Austria	BRM7L	2006
Culham Center for Fusion Energy, UK	ITPA databases	2005
CEA, France		2000
Tsinghua University, Beijing, CHINA	SUNIST	2009

SUMMARY OF SIGNATURE C-MOD ACHIEVEMENTS

• C-Mod is the highest field, diverted tokamak in the world with operation at 8 T and 2 MA.

• Demonstrated tokamak initiation and control with a solid conducting vessel and structure.

• Set world-record P/S power densities of rv1 MW/m2, pro- ducing reactor-level SOL parallel heat flux densities approaching 1 GW/m^2

• Demonstrated the feasibility of a very high-power tokamak operation with a high-Z divertor and plasma facing components, including measurement of erosion and fuel retention rates.

• Invented and established the vertical plate divertor as most favorable for power and particle handling and explored divertor regimes at reactor-like plasma parameters including the neutral-neutral collisionality, neutral opacity, and photon opacity.

• Discovered "main-chamber recycling" phenomenon in C-Mod's diverted plasmas and revealing intermittent, non- diffusive transport in the scrape-off layer as the underlying cause.

• Demonstrated controlled divertor detachment using seeded impurities at high power density and demonstrated good H-mode confinement, H_{98}~1, with Demo-like fractions (90%) of radiated power

• Uncovered evidence for the marginal stability paradigm for SOL turbulent transport with a critical bP gradient decreasing at higher collisionality.

• Identified edge plasma transport and its scaling with collisionality as a key physics ingredient in the empirical tokamak density limit.

• Demonstrated that spatial asymmetries in turbulence and transport drive near-sonic parallel plasma flows in the plasma edge, imposing a toroidal rotation boundary condition for the confined plasma—suggesting a mechanism for the ∇B drift asymmetry in the L-H threshold.

• Carried out the first experiments that characterized the L-H threshold as a critical local temperature or temperature gradient.

• Demonstrated the two stationary ELM-free regimes, the EDA H-mode and I-Mode, where particle and impurity confinement were controlled by continuous, short wave- length electromagnetic modes in the pedestal.

• Demonstrated the quantitative link between pedestal height and core performance across a wide range of oper- ating conditions, validating the theoretically predicted de- pendence of turbulence on R/L_T.

• Discovered and explored large self-generated toroidal flows in the core plasma.

• Demonstrated creation of Internal Transport Barriers via self-generated plasma flows and demonstrated transport control with on-axis RF heating, identifying TEM turbulence via first direct comparison of experiment to nonlinear gyrokinetic simulations processed with synthetic diagnostic.

• Validated gyrokinetic models simultaneously for ion energy, electron energy, and particle transport through groundbreaking, multi-scale simulations.

• Proved experimentally that impurity asymmetry on flux surfaces occurs through mechanisms other than centrifugal force.

• Carried out extensive studies of the spectroscopy and atomic physics of highly ionized atoms, including high n transitions and satellites, critical for development of plasma diagnostics and validation of atomic physics codes.

• Operated ICRF systems routinely at power densities above 10 MW/m^2.

• Validated full-wave ICRF models by comparison with measured wave fields, fast particle distributions, and local heating.

• Demonstrated RF flow drive by ICRF mode conversion.

• Pioneered the field aligned-antenna concept that dramatically reduced high-Z impurity levels in ICRF heated plasmas.

• Demonstrated efficient off-axis current drive with lower hybrid.

• Developed the first full-wave LH codes, using these to explain the decrease in current drive efficiency at high densities.

• Showed the importance of spatial asymmetries and fast dynamics for disruption halo currents and disruption mitigation radiation.

• Advanced the state-of-the-art for diagnosing the core, edge, and SOL plasma and plasma-material interactions.

• Developed MDSplus, a data acquisition and data management system that has become the world standard for fusion experiments.

• Trained nearly 200 graduate students in fusion science, engineering, and plasma physics.

Publications (1998-2018)

Measurements of runaway electron synchrotron spectra at high magnetic fields in Alcator C-Mod

Tinguely, R.A. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Granetz, R.S.; Hoppe, M.; Embre´us, O. **Source:** *Nuclear Fusion*, v 58, n 7, p 076019 (14 pp.), July 2018

The dependence of divertor power sharing on magnetic flux balance in near double-null configurations on Alcator C-Mod

Brunner, D. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Kuang, A.Q.; LaBombard, B.; Terry, J.L. **Source:** *Nuclear Fusion*, v 58, n 7, p 076010 (17 pp.), July 2018

Verification of GENE and GYRO with L-mode and I-mode plasmas in Alcator C-Mod

Mikkelsen, D.R. (Princeton Plasma Phys. Lab., Princeton, NJ, United States); Howard, N.T.; White, A.E.; Creely, A.J. **Source:** *Physics of Plasmas*, v 25, n 4, p 042505 (11 pp.), April 2018

Intermittent electron density and temperature fluctuations and associated fluxes in the Alcator C-Mod scrape-off layer

Kube, R. (Dept. of Phys. & Technol., UiT The Arctic Univ. of Norway, Tromso, Norway); Garcia, O.E.; Theodorsen, A.; Brunner, D.; Kuang, A.Q.; LaBombard, B.; Terry, J.L. **Source:** *Plasma Physics and Controlled Fusion*, v 60, n 6, p 065002 (16 pp.), June 2018

The flush-mounted rail Langmuir probe array designed for the Alcator C-Mod vertical target plate divertor

Kuang, A.Q. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Brunner, D.; LaBombard, B.; Leccacorvi, R.; Vieira, R. **Source:** *Review of Scientific Instruments*, v 89, n 4, p 043512 (7 pp.), April 2018

Investigation of the critical edge ion heat flux for L-H transitions in Alcator C-Mod and its dependence on BT

Schmidtmayr, M. (Inst. of Appl. Phys., Tech. Univ. Wien, Vienna, Austria); Hughes, J.W.; Ryter, F.; Wolfrum, E.; Cao, N.; Creely, A.J.; Howard, N.; Hubbard, A.E.; Lin, Y.; Reinke, M.L.; Rice, J.E.; Tolman, E.A.; Wukitch, S.; Ma, Y.; ASDEX Upgrade Team; Alcator C-Mod Team **Source:** *Nuclear Fusion*, v 58, n 5, p 056003 (9 pp.), May 2018

Helium experiments on Alcator C-Mod in support of ITER early operations

Kessel, C.E. (Princeton Plasma Phys. Lab., Princeton, NJ, United States); Wolfe, S.M.; Reinke, M.L.; Hughes, J.W.; Lin, Y.; Wukitch, S.J.; Baek, S.G.; Bonoli, P.T.; Chilenski, M.; Diallo, A. **Source:** *Nuclear Fusion*, v 58, n 5, p 056007 (14 pp.), May 2018

Electron critical gradient scale length measurements of ICRF heated L-mode plasmas at Alcator C-Mod tokamak

Houshmandyar, S. (Inst. for Fusion Studies, Univ. of Texas at Austin, Austin, TX, United States); Hatch, D.R.; Horton, C.W.; Liao, K.T.; Phillips, P.E.; Rowan, W.L.; Zhao, B.; Cao, N.M.; Ernst, D.R.; Greenwald, M.; Howard, N.T.; Hubbard, A.E.; Hughes, J.W.; Rice, J.E. **Source:** *Physics of Plasmas*, v 25, n 4, p 042305 (11 pp.), April 2018

Intermittent fluctuations in the Alcator C-Mod scrape-off layer for ohmic and high confinement mode plasmas

Garcia, O.E. (Dept. of Phys. & Technol., UiT The Arctic Univ. of Norway, Tromsø, Norway); Kube, R.; Theodorsen, A.; LaBombard, B.; Terry, J.L. **Source:** *Physics of Plasmas*, v 25, n 5, p 056103 (7 pp.), May 2018

Influence of high magnetic field on access to stationary H-modes and pedestal characteristics in Alcator C-Mod

Tolman, E.A. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Hughes, J.W.; Wolfe, S.M.; Wukitch, S.J.; LaBombard, B.; Hubbard, A.E.; Marmar, E.S.; Snyder, P.B.; Schmidtmayr, M. **Source:** *Nuclear Fusion*, v 58, n 4, p 046004 (11 pp.), April 2018

An experimental assessment of methods used to compute secondary electron emission yield for tungsten and molybdenum electrodes based on exposure to Alcator C-Mod scrape-off layer plasmas

McCarthy, W. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); LaBombard, B.; Brunner, D.; Kuang, A.Q. **Source:** *Plasma Physics and Controlled Fusion*, v 60, n 3, p 035011 (11 pp.), March 2018

High-resolution disruption halo current measurements using Langmuir probes in Alcator C-Mod

Tinguely, R.A. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Granetz, R.S.; Berg, A.; Kuang, A.Q.; Brunner, D.; LaBombard, B. **Source:** *Nuclear Fusion*, v 58, n 1, p 016005 (9 pp.), Jan. 2018

Multi-scale gyrokinetic simulations of an alcator C-Mod, ELM-y H-mode plasma

Howard, N.T. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Holland, C.; White, A.E.; Greenwald, M.; Rodriguez-Fernandez, P.; Candy, J.; Creely, A.J. **Source:** *Plasma Physics and Controlled Fusion*, v 60, n 1, p 014034 (11 pp.), Jan. 2018

Exploratory machine learning studies for disruption prediction using large databases on DIII-D

Rea, C., Granetz, R.S,. **Source:** *Fusion Science and Technology*, 2018

Disruption prediction investigations using machine learning tools on DIII-D and Alcator C-Mod

Rea, C., Granetz, R.S., Montes, K., Tinguely, R.A., Eidietis, N., Hanson, J.M., Sammuli, B., **Source:** *Plasma Physics and Controlled Fusion*, vol. 60, 084004, 2018

Design and operation of a high-heat flux, flush-mounted `rail' Langmuir probe array on Alcator C-Mod

Kuang, A.Q. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Brunner, D.; LaBombard, B.; Leccacorvi, R.; Vieira, R. **Source:** *Nuclear Materials and Energy*, v 12, p 1231-5, Aug. 2017

Fast imaging of filaments in the X-point region of Alcator C-Mod

Terry, J.L. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Ballinger, S.; Brunner, D.; LaBombard, B.; White, A.E.; Zweben, S.J. **Source:** *Nuclear Materials and Energy*, v 12, p 989-93, Aug. 2017

SOLPS-ITER Study of neutral leakage and drift effects on the alcator C-Mod divertor plasma

Dekeyser, W. (ITER Organ., St. Paul-lez-Durance, France); Bonnin, X.; Lisgo, S.W.; Pitts, R.A.; Brunner, D.; LaBombard, B.; Terry, J.L. **Source:** *Nuclear Materials and Energy*, v 12, p 899-907, Aug. 2017

ICRF mode conversion in three-ion species heating experiment and in flow drive experiment on the Alcator C-Mod tokamak

Lin, Y. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Wukitch, S.J.; Edlund, E.; Ennever, P.; Hubbard, A.E.; Porkolab, M.; Rice, J.; Wright, J. **Source:** *EPJ Web of Conferences*, v 157, p 03030 (4 pp.), 2017

LHCD during current ramp experiments on Alcator C-Mod

Wallace, G.M. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Poli,

F.; Chilenski, M.A.; Hughes, J.W.; Mumgaard, R.T.; Scott, S.D.; Shiraiwa, S.; Wukitch, S.J. **Source:** *EPJ Web of Conferences*, v 157, p 03063 (4 pp.), 2017

Impact of perturbative, non-axisymmetric impurity fueling on Alcator C-Mod H-modes

Reinke, M.L. (Oak Ridge Nat. Lab., Oak Ridge, TN, United States); Lore, J.D.; Terry, J.; Brunner, D.; LaBombard, B.; Lipschultz, B.; Hubbard, A.; Hughes, J.W.; Mumgaard, R.; Pitts, R.A. **Source:** *Plasma Physics and Controlled Fusion*, v 59, n 12, p 122002 (6 pp.), Dec. 2017

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Hubbard, A.E. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Baek, S.-G.; Brunner, D.; Creely, A.J.; Cziegler, I.; Edlund, E.; Hughes, J.W.; LaBombard, B.; Lin, Y.; Liu, Z.; Marmar, E.S.; Reinke, M.L.; Rice, J.E.; Sorbom, B.; Sung, C.; Terry, J.; Theiler, C.; Tolman, E.A.; Walk, J.R.; White, A.E.; Whyte, D.; Wolfe, S.M.; Wukitch, S.; Xu, X.Q. **Source:** *Nuclear Fusion*, v 57, n 12, p 126039 (11 pp.), Dec. 2017

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Koert, P. (Massachusetts Institute of Technology, Plasma Science and Fusion Center, Cambridge; MA; 02139, United States); Terry, D.; Fitzgerald, E.; Wukitch, S. **Source:** *Fusion Science and Technology*, v 72, n 3, p 483-487, October 2017

Characterization and origin of large size dust particles produced in the Alcator C-Mod tokamak

Arnas, C. (Lab. PIIM, Aix-Marseille Univ., Marseille, France); Irby, J.; Celli, S.; De Temmerman, G.; Addab, Y.; Coue¨del, L.; Grisolia, C.; Lin, Y.; Martin, C.; Pardanaud, C.; Pierson, S. **Source:** *Nuclear Materials and Energy*, v 11, p 12-19, May 2017

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Theodorsen, A. (Dept. of Phys. & Technol., UiT The Arctic Univ. of Norway, Tromso, Norway); Garcia, O.E.; Kube, R.; LaBombard, B.; Terry, J.L. **Source:** *Nuclear Fusion*, v 57, n 11, p 114004 (7 pp.), Nov. 2017

Characterization of SOL plasma flows and potentials in ICRF-heated plasmas in Alcator C-mod

Hong, R. (Center for Energy Res., Univ. of California San Diego, La Jolla, CA, United

States); Wukitch, S.J.; Lin, Y.; Terry, J.L.; Cziegler, I.; Reinke, M.L.; Tynan, G.R. **Source:** *Plasma Physics and Controlled Fusion*, v 59, n 10, p 105008 (8 pp.), Oct. 2017

Edge turbulence and divertor heat flux width simulations of Alcator C-Mod discharges using an electromagnetic two-fluid model

Chen, B. (Sch. of Nucl. Sci. & Technol., Univ. of Sci. & Technol. of China, Hefei, China); Xu, X.Q.; Xia, T.Y.; Porkolab, M.; Edlund, E.; LaBombard, B.; Terry, J.; Hughes, J.W.; Mao, S.F.; Ye, M.Y.; Wan, Y.X. **Source:** *Nuclear Fusion*, v 57, n 11, p 116025 (14 pp.), Nov. 2017

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Brunner, D. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Wolfe, S.M.; LaBombard, B.; Kuang, A.Q.; Lipschultz, B.; Reinke, M.L.; Hubbard, A.; Hughes, J.; Mumgaard, R.T.; Terry, J.L.; Umansky, M.V. **Source:** *Nuclear Fusion*, v 57, n 8, p 086030 (12 pp.), Aug. 2017

Linear servomotor probe drive system with real-time self-adaptive position control for the Alcator C-Mod tokamak

Brunner, D. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Kuang, A.Q.; LaBombard, B.; Burke, W. **Source:** *Review of Scientific Instruments*, v 88, n 7, p 073501 (13 pp.), July 2017

Outer midplane scrape-off layer profiles and turbulence in simulations of Alcator C-Mod inner-wall limited discharges

Halpern, F.D. (Gen. Atomics, San Diego, CA, United States); LaBombard, B.; Terry, J.L.; Zweben, S.J. **Source:** *Physics of Plasmas*, v 24, n 7, p 072502 (12 pp.), July 2017

On the correlation between `non-local' effects and intrinsic rotation reversals in Alcator C-Mod

Rodriguez-Fernandez, P. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Rice, J.E.; Cao, N.M.; Creely, A.J.; Howard, N.T.; Hubbard, A.E.; Irby, J.H.; White, A.E. **Source:** *Nuclear Fusion*, v 57, n 7, p 074001 (6 pp.), July 2017

Chaotic edge density fluctuations in the Alcator C-Mod tokamak

Zhu, Z. (Dept. of Phys. & Astron., Univ. of California, Los Angeles, Los Angeles, CA,

United States); White, A.E.; Carter, T.A.; Baek, S.G.; Terry, J.L. **Source:** *Physics of Plasmas*, v 24, n 4, p 042301 (12 pp.), April 2017

Validation of nonlinear gyrokinetic simulations of L- and I-mode plasmas on Alcator C-Mod

Creely, A.J. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Howard, N.T.; Rodriguez-Fernandez, P.; Cao, N.; Hubbard, A.E.; Hughes, J.W.; Rice, J.E.; White, A.E.; Candy, J.; Staebler, G.M.; Conway, G.D.; Freethy, S.J.; Sung, C. **Source:** *Physics of Plasmas*, v 24, n 5, p 056104 (11 pp.), May 2017

Radial localization of edge modes in Alcator C-Mod pedestals using optical diagnostics

Theiler, C. (Swiss Plasma Center, Ecole Polytech. Fed. de Lausanne, Lausanne, Switzerland); Terry, J.L.; Edlund, E.; Cziegler, I.; Churchill, R.M.; Hughes, J.W.; LaBombard, B.; Golfinopoulos, T. **Source:** *Plasma Physics and Controlled Fusion*, v 59, n 2, p 025016 (15 pp.), 1 Feb. 2017

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Shinya, T. (Univ. of Tokyo, Kashiwa, Japan); Baek, S.G.; Wallace, G.M.; Shiraiwa, S.; Takase, Y.; Parker, R.R.; Bonoli, P.T.; Brunner, D.; Faust, I.; LaBombard, B.L.; Wukitch, S. **Source:** *Nuclear Fusion*, v 57, n 3, p 036005 (4 pp.), March 2017

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Pankin, A.Y. (Tech-X Corp., Boulder, CO, United States); Hughes, J.W.; Greenwald, M.J.; Kritz, A.H.; Rafiq, T. **Source:** *Nuclear Fusion*, v 57, n 2, p 022012 (7 pp.), Feb. 2017

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Greenwald, M. (Massachusetts Institute of Technology, Cambridge; MA, United States) **Source:** *Magnetic Fusion Energy: From Experiments to Power Plants*, p 295-322, June 20, 2016

The physics mechanisms of the weakly coherent mode in the Alcator C-Mod Tokamak

Liu, Z.X. (Inst. of Plasma Phys., Hefei, China); Xu, X.Q.; Gao, X.; Hubbard, A.E.; Hughes, J.W.; Walk, J.R.; Theiler, C.; Xia, T.Y.; Baek, S.G.; Golfinopoulos, T.; Whyte, D.; Zhang, T.; Li, J.G. **Source:** *Physics of Plasmas*, v 23, n 12, p 120703 (5 pp.), Dec. 2016

The multi-spectral line-polarization MSE system on Alcator C-Mod

Mumgaard, R.T. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Scott, S.D.; Khoury, M. **Source:** *Review of Scientific Instruments*, v 87, n 11, p 11E527 (3 pp.), Nov. 2016

FIR polarimetry on the Alcator C-Mod tokamak

Irby, J.H. (Massachusetts Inst. of Technol., Albany, MA, United States) **Source:** *2016 IEEE International Conference on Plasma Science (ICOPS)*, p 1 pp., 2016

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Russell, D.A. (Lodestar Res. Corp., Boulder, CO, United States); Myra, J.R.; D'Ippolito, D.A.; LaBombard, B.; Hughes, J.W.; Terry, J.L.; Zweben, S.J. **Source:** *Physics of Plasmas*, v 23, n 6, p 062305 (10 pp.), June 2016

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Faust, I.C. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Brunner, D.; LaBombard, B.; Parker, R.R.; Terry, J.L.; Whyte, D.G.; Baek, S.G.; Edlund, E.; Hubbard, A.E.; Hughes, J.W.; Kuang, A.Q.; Reinke, M.L.; Shiraiwa, S.; Wallace, G.M.; Walk, J.R. **Source:** *Physics of Plasmas*, v 23, n 5, p 056115 (11 pp.), May 2016

Fluctuation statistics in the scrape-off layer of Alcator C-Mod

Kube, R. (Dept. of Phys. & Technol., UiT The Arctic Univ. of Norway, Tromso, Norway); Theodorsen, A.; Garcia, O.E.; LaBombard, B.; Terry, J.L. **Source:** *Plasma Physics and Controlled Fusion*, v 58, n 5, p 054001 (13 pp.), May 2016

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Brunner, D. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Burke, W.; Kuang, A.Q.; LaBombard, B.; Lipschultz, B.; Wolfe, S. **Source:** *Review of Scientific Instruments*, v 87, n 2, p 023504 (7 pp.), Feb. 2016

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Creely, A.J. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); White, A.E.; Edlund, E.M.; Howard, N.T.; Hubbard, A.E. **Source:** *Nuclear Fusion*, v 56, n 3, p 036003 (12 pp.), March 2016

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Rice, J.E. (PSFC, MIT, Cambridge, MA, United States); Gao, C.; Mumgaard, R.; Parker, R.R.; Scott, S.D.; Shiraiwa, S.; Wallace, G.M.; Bonoli, P.T.; Delgado-Aparicio, L.; Fenzi, C.; Granetz, R.S.; Greenwald, M.J.; Hubbard, A.E.; Hughes, J.W.; Irby, J.H.; Lee, J.P.; Marmar, E.S.; Reinke, M.L.; Wolfe, S.M. **Source:** *Nuclear Fusion*, v 56, n 3, p 036015 (7 pp.), March 2016

Study of toroidal flow generation by ion cyclotron range of frequency minority heating in the Alcator C-Mod plasma

Murakami, S. (Dept. of Nucl. Eng., Kyoto Univ., Kyoto, Japan); Itoh, K.; Zheng, L.J.; Van Dam, J.W.; Bonoli, P.; Rice, J.E.; Fiore, C.L.; Gao, C.; Fukuyama, A. **Source:** *Physics of Plasmas*, v 23, n 1, p 012501 (8 pp.), Jan. 2016

Fluctuation statistics in the scrape-off layer of Alcator C-Mod

Kube, R. (Institute for Applied Physics and Ion Physics, University of Innsbruck, Austria); Garcia, O.E.; Labombard, B.; Terry, J.L. **Source:** *42nd European Physical Society Conference on Plasma Physics, EPS 2015*, 2015, *42nd European Physical Society Conference on Plasma Physics, EPS 2015*

Poloidal asymmetries in edge pedestals on Alcator C-Mod

Theiler, C. (PSFC-MIT, Cambridge, United States); Churchill, R.M.; Hutchinson, I.H.; Lipschultz, B.; Catto, P.J.; Chang, C.S.; Edlund, E.; Ennever, P.; Ernst, D.R.; Hager, R.; Hubbard, A.E.; Hughes, J.W.; Landreman, M.; Marmar, E.S.; Parra, F.I.; Reinke, M.L.; Terry, J.L.; Walk, J.R.; Whyte, D. **Source:** *42nd European Physical Society Conference on Plasma Physics, EPS 2015*, 2015, *42nd European Physical Society Conference on Plasma Physics, EPS 2015*

Design and fabrication of a DC feeder system of new TF magnet power supply for accelerator-based in-situ materials surveillance in Alcator C-Mod

Zhou, Lihua (Massachusetts Institute of Technology, Plasma Science and Fusion Center, Cambridge; MA; 02139, United States); Vieira, Rui; Doody, Jeffrey; Beck, William; Terry, David; Cochran, William; Irby, James; Hartwig, Zach; Barnard, Harold; Sorbom, Brandon; Whyte, Dennis **Source:** *Fusion Science and Technology*, v 68, n 2, p 448-452, September 1, 2015, *Proceedings of the 21st Topical Meeting on the Technology of Fusion Energy, TOFE 2014*

Engineering the Alcator C-Mod MSE diagnostic: Solutions to reactor-relevant diagnostic challenges

Mumgaard, R.T. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Scott, S.D. **Source:** *2015 IEEE 26th Symposium on Fusion Engineering (SOFE)*, p 8 pp., 2015

Engineering upgrades to the accelerator-based in-situ materials surveillance diagnostic on Alcator C-Mod

Hartwig, Z.S. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Barnard, B.S.; Beck, W.K.; Binus, A.; Burke, W.M.; Cochran, W.J.; Doody, J.; Johnson, D.K.; Kesler, L.A.; Lanza, R.C.; Morrell, J.T.; Murray, R.A.; Sorbom, B.N.; Stahle, P.W.; Terry, D.R.; Toland, T.L.; Vieira, R.F.; Whyte, D.G.; Zhou, L.; Johnson, E. **Source:** *2015 IEEE 26th Symposium on Fusion Engineering (SOFE)*, p 7 pp., 2015

Real-time high-field measurements of joint resistance in the alcator C-mod TF coil

Burke, W. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Kanojia, A.; Stillerman, J. **Source:** *2015 IEEE 26th Symposium on Fusion Engineering (SOFE)*, p 5 pp., 2015

Measurement of LHCD edge power deposition through modulation techniques on Alcator C-Mod

Faust, I.C. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Brunner, D.; LaBombard, B.; Parker, R.R.; Baek, S.G.; Chilenksi, M.A.; Edlund, E.; Hubbard, A.; Hughes, J.W.; Terry, J.L.; Shiraiwa, S.; Walk, J.R.; Wallace, G.M.; Whyte, D.G. **Source:** *AIP Conference Proceedings*, v 1689, p 080006 (6 pp.), 2015

ICRF antenna matching system with ferrite tuners for the Alcator C-Mod tokamak

Lin, Y. (Gen. Atomics, San Diego, CA, United States); Binus, A.; Wukitch, S.J.; Koert, P.; Murray, R.; Pfeiffer, A. **Source:** *AIP Conference Proceedings*, v 1689, p 070009 (4 pp.), 2015

Measurement and simulation of ICRF wave intensity with a recalibrated phase contrast imaging diagnostic on Alcator C-Mod

Tsujii, N. (Univ. of Tokyo, Kashiwa, Japan); Porkolab, M.; Bonoli, P.T.; Edlund, E.M.; Ennever, P.C.; Lin, Y.; Wright, J.C.; Wukitch, S.J.; Jaeger, E.F.; Green, D.L.; Harvey, R.W. **Source:** *AIP Conference Proceedings*, v 1689, p 040005 (4 pp.), 2015

tatus of diagnostic development to measure parallel wavenumber of lower hybrid waves on Alcator C-Mod

Baek, S.G. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Wallace, G.M.; Shinya, T.; Shiraiwa, S.; Parker, R.R.; Takase, Y.; Brunner, D. **Source:** *AIP Conference Proceedings*, v 1689, p 080005 (4 pp.), 2015

ICRF antenna matching systems with ferrite tuners for the Alcator C-Mod

tokamak

Lin, Y. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Binus, A.; Wukitch, S.J.; Koert, P.; Murray, R.; Pfeiffer, A. **Source:** *Fusion Engineering and Design*, v 100, p 239-48, Nov. 2015

Kinetic modeling of divertor heat load fluxes in the Alcator C-Mod and DIII-D tokamaks

Pankin, A.Y. (Tech-X Corp., Boulder, CO, United States); Rafiq, T.; Kritz, A.H.; Park, G.Y.; Chang, C.S.; Brunner, D.; Groebner, R.J.; Hughes, J.W.; LaBombard, B.; Terry, J.L.; Ku, S. **Source:** *Physics of Plasmas*, v 22, n 9, p 092511 (7 pp.), Sept. 2015

Design and fabrication of a dc feeder system of new TF magnet power supply for accelerator-based in-situ materials surveillance in Alcator C-mod

Zhou, Lihua (Massachusetts Institute of Technology, Plasma Science and Fusion Center, Cambridge; MA; 02139, United States); Vieira, Rui; Doody, Jeffrey; Beck, William; Terry, David; Cochran, William; Irby, James; Hartwig, Zach; Barnard, Harold; Sorbom, Brandon; Whyte, Dennis **Source:** *Fusion Science and Technology*, v 68, n 2, p 448-452, September 1, 2015

Validation of full-wave simulations for mode conversion of waves in the ion cyclotron range of frequencies with phase contrast imaging in Alcator C-Mod

Tsujii, N. (Grad. Sch. of Frontier Sci., Univ. of Tokyo, Kashiwa, Japan); Porkolab, M.; Bonoli, P.T.; Edlund, E.M.; Ennever, P.C.; Lin, Y.; Wright, J.C.; Wukitch, S.J.; Jaeger, E.F.; Green, D.L.; Harvey, R.W. **Source:** *Physics of Plasmas*, v 22, n 8, p 082502 (9 pp.), Aug. 2015

Alcator C-Mod: research in support of ITER and steps beyond

Marmar, E.S. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Baek, S.G.; Barnard, H.; Bonoli, P.; Brunner, D.; Candy, J.; Canik, J.; Churchill, R.M.; Cziegler, I.; Dekow, G.; Delgado-Aparicio, L.; Diallo, A.; Edlund, E.; Ennever, P.; Faust, I.; Fiore, C.; Chi Gao; Golfinopoulos, T.; Greenwald, M.; Hartwig, Z.S.; Holland, C.; Hubbard, A.E.; Hughes, J.W.; Hutchinson, I.H.; Irby, J.; LaBombard, B.; Yijun Lin; Lipschultz, B.; Loarte, A.; Mumgaard, R.; Parker, R.R.; Porkolab, M.; Reinke, M.L.; Rice, J.E.; Scott, S.; Shiraiwa, S.; Snyder, P.; Sorbom, B.; Terry, D.; Terry, J.L.; Theiler, C.; Vieira, R.; Walk, J.R.; Wallace, G.M.; White, A.; Whyte, D.; Wolfe, S.M.; Wright, G.M.; Wright, J.; Wukitch, S.J.; Xu, P. **Source:** *Nuclear Fusion*, v 55, n 10, p 104020 (22 pp.), Oct. 2015

Correlation ECE diagnostic in Alcator C-Mod

Sung, C. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge,

MA, United States); White, A.E.; Howard, N.T.; Mikkelsen, D.; Irby, J.; Leccacorvi, R.; Vieira, R.; Oi, C.; Rice, J.; Reinke, M.; Gao, C.; Ennever, P.; Porkolab, M.; Churchill, R.; Theiler, C.; Walk, J.; Hughes, J.; Hubbard, A.; Greenwald, M. **Source:** *EPJ Web of Conferences*, v 87, p 03007 (6 pp.), 2015

EMC3-EIRENE modeling of toroidally-localized divertor gas injection experiments on Alcator C-Mod

Lore, J.D. (Oak Ridge Nat. Lab., Oak Ridge, TN, United States); Reinke, M.L.; LaBombard, B.; Lipschultz, B.; Churchill, R.M.; Pitts, R.A.; Feng, Y. **Source:** *Journal of Nuclear Materials*, v 463, p 515-18, Aug. 2015

Nonlinear transfer in heated L-modes approaching the L-H transition threshold in Alcator C-Mod

Cziegler, I. (Center for Momentum Transp. & Flow Organ., Univ. of California San Diego, La Jolla, CA, United States); Tynan, G.R.; Diamond, P.H.; Hubbard, A.E.; Hughes, J.W.; Irby, J.; Terry, J.L. **Source:** *Nuclear Fusion*, v 55, n 8, p 083007 (9 pp.), Aug. 2015

Fuel retention measurements in Alcator C-Mod using accelerator-based in situ materials surveillance

Hartwig, Z.S. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Barnard, H.S.; Sorbom, B.N.; Lanza, R.C.; Lipschultz, B.; Stahle, P.W.; Whyte, D.G. **Source:** *Journal of Nuclear Materials*, v 463, p 73-7, Aug. 2015

Multispecies density peaking in gyrokinetic turbulence simulations of low collisionality Alcator C-Mod plasmas

Mikkelsen, D.R. (Princeton Plasma Phys. Lab., Princeton, NJ, United States); Bitter, M.; Delgado-Aparicio, L.; Hill, K.W.; Greenwald, M.; Howard, N.T.; Hughes, J.W.; Rice, J.E.; Reinke, M.L.; Podpaly, Y.; Ma, Y.; Candy, J.; Waltz, R.E. **Source:** *Physics of Plasmas*, v 22, n 6, p 062301 (13 pp.), June 2015

Tungsten impurity transport experiments in Alcator C-Mod to address high priority research and development for ITERa)

Loarte, A. (ITER Organ., St. Paul-lez-Durance, France); Reinke, M.L.; Polevoi, A.R.; Hosokawa, M.; Chilenski, M.; Howard, N.; Hubbard, A.; Hughes, J.W.; Rice, J.E.; Walk, J.; Ko¨chl, F.; Pu¨tterich, T.; Dux, R.; Zhogolev, V.E. **Source:** *Physics of Plasmas*, v 22, n 5, p 056117 (15 pp.), May 2015

Three-dimensional simulation of H-mode plasmas with localized divertor impurity injection on Alcator C-Mod using the edge transport code EMC3-EIRENEa)

Lore, J.D. (Oak Ridge Nat. Lab., Oak Ridge, TN, United States); Reinke, M.L.; Brunner, D.; LaBombard, B.; Lipschultz, B.; Terry, J.; Pitts, R.A.; Feng, Y. **Source:** *Physics of Plasmas*, v 22, n 5, p 056106 (6 pp.), May 2015

Comparison of 3D flux-driven scrape-off layer turbulence simulations with gas-puff imaging of Alcator C-Mod inner-wall limited discharges

Halpern, F.D. (Centre de Rech. en Phys. des Plasmas (CRPP), Ecole Polytech. Fed. de Lausanne (EPFL), Lausanne, Switzerland); Terry, J.L.; Zweben, S.J.; LaBombard, B.; Podesta, M.; Ricci, P. **Source:** *Plasma Physics and Controlled Fusion*, v 57, n 5, p 054005 (10 pp.), May 2015

Quasi-coherent fluctuations limiting the pedestal growth on Alcator C-Mod: experiment and modelling

Diallo, A. (Princeton Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Hughes, J.W.; Baek, S.-G.; LaBombard, B.; Terry, J.; Cziegler, I.; Hubbard, A.; Davis, E.; Walk, J.; Delgado-Aparicio, L.; Reinke, M.L.; Theiler, C.; Churchill, R.M.; Edlund, E.M.; Canik, J.; Snyder, P.; Greenwald, M.; White, A. **Source:** *Nuclear Fusion*, v 55, n 5, p 053003 (11 pp.), May 2015

High density LHRF experiments in Alcator C-Mod and implications for reactor scale devices

Baek, S.G. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Parker, R.R.; Bonoli, P.T.; Shiraiwa, S.; Wallace, G.M.; LaBombard, B.; Faust, I.C.; Porkolab, M.; Whyte, D.G. **Source:** *Nuclear Fusion*, v 55, n 4, p 043009 (16 pp.), April 2015

Core impurity transport in Alcator C-Mod L-, I- and H-mode plasmas

Rice, J.E. (PSFC, MIT, Cambridge, MA, United States); Reinke, M.L.; Gao, C.; Howard, N.T.; Chilenski, M.A.; Delgado-Aparicio, L.; Granetz, R.S.; Greenwald, M.J.; Hubbard, A.E.; Hughes, J.W.; Irby, J.H.; Lin, Y.; Marmar, E.S.; Mumgaard, R.T.; Scott, S.D.; Terry, J.L.; Walk, J.R.; White, A.E.; Whyte, D.G.; Wolfe, S.M.; Wukitch, S.J. **Source:** *Nuclear Fusion*, v 55, n 3, p 033014 (12 pp.), March 2015

A small, novel, remote in-vessel tion system for the Alcator C-Mod tokamak

Mumgaard, R.T. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Vieira, R.; Parkin, W.; Scott, S.D. **Source:** *Fusion Engineering and Design*, v 89, n 11, p 2784-8, Nov. 2014

20 years of research on the Alcator C-Mod tokamak

Greenwald, M. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States);

Bader, A.; Baek, S.; Bakhtiari, M.; Barnard, H.; Beck, W.; Bergerson, W.; Bespamyatnov, I.; Bonoli, P.; Brower, D.; Brunner, D.; Burke, W.; Candy, J.; Churchill, M.; Cziegler, I.; Diallo, A.; Dominguez, A.; Duval, B.; Edlund, E.; Ennever, P.; Ernst, D.; Faust, I.; Fiore, C.; Fredian, T.; Garcia, O.; Gao, C.; Goetz, J.; Golfinopoulos, T.; Granetz, R.; Grulke, O.; Hartwig, Z.; Horne, S.; Howard, N.; Hubbard, A.; Hughes, J.; Hutchinson, I.; Irby, J.; Izzo, V.; Kessel, C.; LaBombard, B.; Lau, C.; Li, C.; Lin, Y.; Lipschultz, B.; Loarte, A.; Marmar, E.; Mazurenko, A.; McCracken, G.; McDermott, R.; Meneghini, O.; Mikkelsen, D.; Mossessian, D.; Mumgaard, R.; Myra, J.; Nelson-Melby, E.; Ochoukov, R.; Olynyk, G.; Parker, R.; Pitcher, S.; Podpaly, Y.; Porkolab, M.; Reinke, M.; Rice, J.; Rowan, W.; Schmidt, A.; Scott, S.; Shiraiwa, S.; Sierchio, J.; Smick, N.; Snipes, J.A.; Snyder, P.; Sorbom, B.; Stillerman, J.; Sung, C.; Takase, Y.; Tang, V.; Terry, J.; Terry, D.; Theiler, C.; Tronchin-James, A.; Tsujii, N.; Vieira, R.; Walk, J.; Wallace, G.; White, A.; Whyte, D.; Wilson, J.; Wolfe, S.; Wright, G.; Wright, J.; Wukitch, S.; Zweben, S. **Source:** *Physics of Plasmas*, v 21, n 11, p 110501 (50 pp.), Nov. 2014

Impurity transport in Alcator C-Mod in the presence of poloidal density variation induced by ion cyclotron resonance heating

Molle´n, A. (Dept. of Appl. Phys., Chalmers Univ. of Technol., Goteborg, Sweden); Pusztai, I.; Reinke, M.L.; Kazakov, Ye.O.; Howard, N.T.; Belli, E.A.; Fu¨lo¨p, T. **Source:** *Plasma Physics and Controlled Fusion*, v 56, n 12, p 124005 (14 pp.), Dec. 2014

Impurity transport, turbulence transitions and intrinsic rotation in Alcator C-Mod plasmas

Howard, N.T. (Oak Ridge Inst. for Sci. & Educ. (ORISE), Oak Ridge, TN, United States); White, A.E.; Greenwald, M.; Holland, C.; Candy, J.; Rice, J.E. **Source:** *Plasma Physics and Controlled Fusion*, v 56, n 12, p 124004 (12 pp.), Dec. 2014

Inboard and outboard radial electric field wells in the H- and I-mode pedestal of Alcator C-Mod and poloidal variations of impurity temperature

Theiler, C. (Plasma Science and Fusion Center, Massachusetts Institute of Technology (MIT), Cambridge, MA 02139, United States); Churchill, R.M.; Lipschultz, B.; Landreman, M.; Ernst, D.R.; Hughes, J.W.; Catto, P.J.; Parra, F.I.; Hutchinson, I.H.; Reinke, M.L.; Hubbard, A.E.; Marmar, E.S.; Terry, J.T.; Walk, J.R. **Source:** *Nuclear Fusion*, v 54, n 8, August 1, 2014

Measurement of electron temperature fluctuations using a tunable correlation electron cyclotron emission system on Alcator C-Mod

Howard, N.T. (Oak Ridge Inst. for Sci. & Educ. (ORISE), Oak Ridge, TN, United States);

Sung, C.; White, A.E. **Source:** *Review of Scientific Instruments*, v 85, n 11, p 11D811 (4 pp.), Nov. 2014

Reduction of core turbulence in I-mode plasmas in Alcator C-Mod

White, A.E. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Barnes, M.; Dominguez, A.; Greenwald, M.; Howard, N.T.; Hubbard, A.E.; Hughes, J.W.; Mikkelsen, D.R.; Parra, F.I.; Reinke, M.L.; Sung, C.; Walk, J.; Whyte, D.G. **Source:** *Nuclear Fusion*, v 54, n 8, p 083019 (8 pp.), Aug. 2014

Non-local heat transport in Alcator C-Mod ohmic L-mode plasmas

Gao, C. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Rice, J.E.; Sun, H.J.; Reinke, M.L.; Howard, N.T.; Mikkelson, D.; Hubbard, A.E.; Chilenski, M.A.; Walk, J.R.; Hughes, J.W.; Ennever, P.C.; Porkolab, M.; White, A.E.; Sung, C.; Delgado-Aparicio, L.; Baek, S.G.; Rowan, W.L.; Brookman, M.W.; Greenwald, M.J.; Granetz, R.S.; Wolfe, S.W.; Marmar, E.S. **Source:** *Nuclear Fusion*, v 54, n 8, p 083025 (14 pp.), Aug. 2014

Zonal flow production in the L-H transition in Alcator C-mod

Cziegler, I. (Center for Momentum Transp. & Flow Organ., Univ. of California San Diego, La Jolla, CA, United States); Tynan, G.R.; Diamond, P.H.; Hubbard, A.E.; Hughes, J.W.; Irby, J.; Terry, J.L. **Source:** *Plasma Physics and Controlled Fusion*, v 56, n 7, p 075013 (9 pp.), July 2014

External excitation of a short-wavelength fluctuation in the Alcator C-Mod edge plasma and its relationship to the quasi-coherent mode

Golfinopoulos, T. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); LaBombard, B.; Parker, R.R.; Burke, W.; Davis, E.; Granetz, R.; Greenwald, M.; Irby, J.; Leccacorvi, R.; Marmar, E.; Parkin, W.; Porkolab, M.; Terry, J.; Vieira, R.; Wolfe, S. **Source:** *Physics of Plasmas*, v 21, n 5, p 056111 (16 pp.), May 2014

Robotic calibration of the motional Stark effect diagnostic on Alcator C-Mod

Mumgaard, R.T. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Scott, S.D.; Jinseok Ko **Source:** *Review of Scientific Instruments*, v 85, n 5, p 053505 (12 pp.), May 2014

New insights on boundary plasma turbulence and the quasi-coherent mode in Alcator C-Mod using a Mirror Langmuir Probea)

LaBombard, B. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Golfinopoulos, T.; Terry, J.L.; Brunner, D.; Davis, E.; Greenwald, M.; Hughes, J.W.

Source: *Physics of Plasmas*, v 21, n 5, p 056108 (17 pp.), May 2014

Wide-frequency range, dynamic matching network and power system for the "Shoelace" radio frequency antenna on the Alcator C-Mod tokamak

Golfinopoulos, T. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); LaBombard, B.; Burke, W.; Parker, R.R.; Parkin, W.; Woskov, P. **Source:** *Review of Scientific Instruments*, v 85, n 4, p 043510 (10 pp.), April 2014

A new fast two-color interferometer at Alcator C-Mod for turbulence measurements and comparison with phase contrast imaging

Kasten, C.P. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); White, A.E.; Irby, J.H. **Source:** *Physics of Plasmas*, v 21, n 4, p 042305 (7 pp.), April 2014

Multi-scale gyrokinetic simulation of Alcator C-Mod tokamak discharges

Howard, N.T. (MIT-Plasma Sci. & Fusion Center, Cambridge, MA, United States); White, A.E.; Greenwald, M.; Holland, C.; Candy, J. **Source:** *Physics of Plasmas*, v 21, n 3, p 032308 (6 pp.), March 2014

X-ray observations of Ca19 +, Ca18 + and satellites from Alcator C-Mod tokamak plasmas

Rice, J.E. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Reinke, M.L.; Ashbourn, J.M.A.; Gao, C.; Victora, M.M.; Chilenski, M.A.; Delgado-Aparicio, L.; Howard, N.T.; Hubbard, A.E.; Hughes, J.W.; Irby, J.H. **Source:** *Journal of Physics B: Atomic, Molecular and Optical Physics*, v 47, n 7, p 075701 (8 pp.), 14 April 2014

Thermal FEA for Alcator C-Mod Advanced Outer Divertor

Lihua Zhou (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Vieira, R.; Harrison, S.; Karnes, D.; Lipschultz, B. **Source:** *IEEE Transactions on Plasma Science*, v 42, n 3, pt.1, p 563-7, March 2014

Experimental investigation of the parallel structure of fluctuations in the scrape-off layer of Alcator C-Mod

Grulke, O. (Greifswald Branch, Max-Planck-Inst. for Plasma Phys., Greifswald, Germany); Terry, J.L.; Cziegler, I.; LaBombard, B.; Garcia, O.E. **Source:** *Nuclear Fusion*, v 54, n 4, p 043012 (12 pp.), April 2014

Development of a Double Stub Tuner for Alcator C-Mod Lower Hybrid Current Drive System

Koert, P. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Terry, D.; Fitzgerald, E.; Kanojia, A.D.; Wallace, G.M.; Murray, R.; Wukitch, S. **Source:** *IEEE Transactions on Plasma Science*, v 42, n 3, pt.1, p 606-9, March 2014

An ITPA joint experiment to study runaway electron generation and suppression

Granetz, R.S., Esposito B., Kim, J.H., Koslowski, R., Lehnen, M., Martin-Solis, Paz-Soldan, C., Rhee, T., Wesley, J.C., Zeng, L., and the ITPA MHD group **Source:** *Phys. Plasmas* 21, 072506, 2014

Measurement of the current profile in Alcator C-Mod with lower hybrid current drive using an upgraded motional stark effect diagnostic

Mumgaard, R.T. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Scott, S.D.; Shiraiwa, S.; Wallace, G.M.; Parker, R.R.; Hughes, J.W.; Granetz, R.S. **Source:** *AIP Conference Proceedings*, v 1580, p 394-7, 2014

ICRF-enhanced plasma potentials in the SOL of Alcator C-Mod

Ochoukov, R. (PSFC, MIT, Cambridge, MA, United States); Whyte, D.G.; Brunner, D.; D'Ippolito, D.A.; LaBombard, B.; Lipschultz, B.; Myra, J.R.; Terry, J.L.; Wukitch, S.J. **Source:** *AIP Conference Proceedings*, v 1580, p 267-70, 2014

LH and ICRF driven scrape-off-layer density modifications and their impact on LH coupling on Alcator C-Mod

Lau, C. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Lin, Y.; Hanson, G.R.; Wallace, G.; Wukitch, S.J.; LaBombard, B.; Ochoukov, R.; Shiraiwa, S.; Terry, J.; Wilgen, J. **Source:** *AIP Conference Proceedings*, v 1580, p 410-13, 2014

Integrated modeling of LHCD experiment on Alcator C-Mod

Shiraiwa, S. (PSFC, MIT, Cambridge, MA, United States); Bonoli, P.; Parker, R.; Wallace, G. **Source:** *AIP Conference Proceedings*, v 1580, p 426-9, 2014

Effect on plasma rotation of lower hybrid (LH) waves in Alcator C-Mod

Lee, J.P. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Barnes, M.; Parker, R.R.; Rice, J.E.; Parra, F.I.; Bonoli, P.T.; Reinke, M.L. **Source:** *AIP Conference Proceedings*, v 1580, p 398-401, 2014

Modeling far-field RF sheaths in Alcator C-Mod

D'Ippolito, D.A. (Lodestar Res. Corp., Boulder, CO, United States); Myra, J.R.; Ochoukov, R.; Whyte, D.G. **Source:** *AIP Conference Proceedings*, v 1580, p 326-9, 2014

ICRF-enhanced plasma potentials in the SOL of Alcator C-Mod

Ochoukov, R. (PSFC MIT, NW17, 175 Albany Street, Cambridge, MA 02139, United States); Whyte, D.G.; Brunner, D.; D'Ippolito, D.A.; Labombard, B.; Lipschultz, B.; Myra, J.R.; Terry, J.L.; Wukitch, S.J. **Source:** *Plasma Physics and Controlled Fusion*, v 56, n 1, January 2014

Observation of fishbone-like internal kink modes during LHCD operation in alcator C-mod

Delgado-Aparicio, L. (Princeton Plasma Physics Laboratory, Princeton, NJ, 08540, United States); Shiraiwa, S.; Sugiyama, L.; Parker, R.; Baek, S.G.; Mumgaard, R.; Granetz, R.; Faust, I.; Scott, S.; Gates, D.A.; Gorelenkov, N.; Bertelli, N.; Bitter, M.; Gao, C.; Greenwald, M.; Hill, K.; Hubbard, A.; Hughes, J.; Irby, J.; Marmar, E.; Meneghini, O.; Pablant, N.; Phillips, P.; Rice, J.E.; Rowan, W.; Walk, J.; Wallace, G.; Wilson, R.; Wolfe, S.; Wukitch, S. **Source:** *40th EPS Conference on Plasma Physics, EPS 2013*, v 1, p 401-404, 2013, *40th EPS Conference on Plasma Physics, EPS 2013*

Thermal analysis to calculate the vessel temperature and stress in Alcator C-Mod due to the divertor upgrade

Han Zhang (Princeton Plasma Phys. Lab., Princeton, NJ, United States); Titus, P.H.; Ellis, R.; Harrison, S.; Vieira, R. **Source:** *Fusion Science and Technology*, v 64, n 2, p 250-4, Aug. 2013

ANSYS model to predict magnetic fields and loads in Alcator C-Mod's new outer divertor during a disruption

Doody, J. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Granetza, R.; Lipschultz, B.; Han Zhang; Titus, P.; Vieira, R. **Source:** *Fusion Science and Technology*, v 64, n 2, p 320-4, Aug. 2013

Heat transfer simulation of a-frame assembly to support Alcator C-Mod outer divertor upgrade

Lihua Zhou (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Vieira, R.; Harrison, S.; Karnes, D.; Lipschultz, B. **Source:** *Fusion Science and Technology*, v 64, n 2, p 293-7, Aug. 2013

Imaging of molybdenum erosion and thermography at visible wavelengths in Alcator C-Mod ICRH and LHCD discharges

James, A.N. (Lawrence Livermore National Laboratory, Fusion Energy Sciences Program, Livermore, CA 94550, United States); Brunner, D.; Labombard, B.; Lau, C.; Lipschultz, B.; Miller, D.; Reinke, M.L.; Terry, J.L.; Theiler, C.; Wallace, G.M.; Whyte, D.G.; Wukitch, S.; Soukhanovskii, V. **Source:** *Plasma Physics and Controlled Fusion*, v 55, n 12, December 2013

In-out impurity density asymmetry in the pedestal region of Alcator C-Mod

Churchill, R.M. (MIT Plasma Science and Fusion Center, Cambridge, MA, United States); Lipschultz, B.; Theiler, C. **Source:** *Nuclear Fusion*, v 53, n 12, December 2013

Benchmark of collisional-radiative models for ITER beams at the Alcator C-Mod tokamak

Bespamyatnov, I.O. (Institute for Fusion Studies, University of Texas at Austin, Austin, TX, United States); Rowan, W.L.; Liao, K.T.; Marchuk, O.; Ralchenko, Yu.; Granetz, R.S. **Source:** *Nuclear Fusion*, v 53, n 12, December 2013

Overview of Experimental Results and code Validation Activities at Alcator C-mod

Greenwald, M. (Massachusetts Inst. of Technol., Cambridge, MA, United States); Bader, A.; Baek, S.; Barnard, H.; Beck, W.; Bergerson, W.; Bespamyatnov, I.; Bitter, M.; Bonoli, P.; Brookman, M.; Brower, D.; Brunner, D.; Burke, W.; Candy, J.; Chilenski, M.; Chung, M.; Churchill, M.; Cziegler, I.; Davis, E.; Dekow, G.; Delgado-Aparicio, L.; Diallo, A.; Ding, W.; Dominguez, A.; Ellis, R.; Ennever, P.; Ernst, D.; Faust, I.; Fiore, C.; Fitzgerald, E.; Fredian, T.; Garcia, O.E.; Gao, C.; Garrett, M.; Golfinopoulos, T.; Granetz, R.; Groebner, R.; Harrison, S.; Harvey, R.; Hartwig, Z.; Hill, K.; Hillairet, J.; Howard, N.; Hubbard, A.E.; Hughes, J.W.; Hutchinson, I.; Irby, J.; James, A.N.; Kanojia, A.; Kasten, C.; Kesner, J.; Kessel, C.; Kube, R.; LaBombard, B.; Lau, C.; Lee, J.; Liao, K.; Lin, Y.; Lipschultz, B.; Ma, Y.; Marmar, E.; McGibbon, P.; Meneghini, O.; Mikkelsen, D.; Miller, D.; Mumgaard, R.; Murray, R.; Ochoukov, R.; Olynyk, G.; Pace, D.; Park, S.; Parker, R.; Podpaly, Y.; Porkolab, M.; Preynas, M.; Pusztai, I.; Reinke, M.; Rice, J.; Rowan, W.; Scott, S.; Shiraiwa, S.; Sierchio, J.; Snyder, P.; Sorbom, B.; Soukhanovskii, V.; Stillerman, J.; Sugiyama, L.; Sung, C.; Terry, D.; Terry, J.; Theiler, C.; Tsujii, N.; Vieira, R.; Walk, J.; Wallace, G.; White, A.; Whyte, D.; Wilson, J.; Wolfe, S.; Woller, K.; Wright, G.; Wright, J.; Wukitch, S.; Wurden, G.; Xu, P.; Yang, C.; Zweben, S. **Source:** *Nuclear Fusion*, v 53, n 10, p 104004 (14 pp.), Oct. 2013

Progress Towards Steady-state Regimes in Alcator C-mod

Shiraiwa, S. (Princeton Plasma Phys. Lab., Princeton, NJ, United States); Baek, G.; Bonoli, P.T.; Faust, I.C.; Hubbard, A.E.; Meneghini, O.; Parker, R.R.; Wallace, G.M.; Wilson, J.R.; Harvey, R.W.; Smirnov, A.P.; Brunner, D.; LaBombard, B.; Lau, C.;

Mumgaard, R.; Scott, S.; Tsujii, N.; Wolfe, S. **Source:** *Nuclear Fusion*, v 53, n 11, p 113028 (10 pp.), Nov. 2013

Attachment of ferrite material used in an active matching network for LHCD on Alcator C-Mod

Murray, R.A. (Massachusetts Inst. of Technol. Plasma Sci. & Fusion Center, Cambridge, MA, United States); Wukitch, S.J.; Fitzgerald, E.; Kanojia, A.D.; Koert, P.; Mackay, G.; Nickerson, J.; Terry, D.; Wallace, G.M. **Source:** *2013 IEEE 25th Symposium on Fusion Engineering (SOFE)*, p 4 pp., 2013

Heat transfer simulation of Alcator C-Mod advanced outer divertor

Zhou, L. (Massachusetts Inst. of Technol., Cambridge, MA, United States); Vieira, R.; Harrison, S.; Karnes, D.; Lipschultz, B. **Source:** *2013 IEEE 25th Symposium on Fusion Engineering (SOFE)*, p 6 pp., 2013

Upgrades to the Alcator C-Mod gas system

Tesfaye, R. (Plasma Sci. & Fusion Center Cambridge, Massachusetts Inst. of Technol., Cambridge, MA, United States); Burke, W.M.; Dekow, G.L.; Toland, T.L. **Source:** *2013 IEEE 25th Symposium on Fusion Engineering (SOFE)*, p 4 pp., 2013

Operation of a double stub tuner for Alcator C-Mod lower hybrid current drive system

Koert, P. (Massachusetts Inst. of Technol. Plasma Sci. & Fusion Center, Cambridge, MA, United States); Terry, D.; Fitzgerald, E.; Kanojia, A.D.; Wallace, G.M.; Murray, R.; Wukitch, S. **Source:** *2013 IEEE 25th Symposium on Fusion Engineering (SOFE)*, p 3 pp., 2013

Alcator C-Mod experiments in support of the ITER baseline 15 MA scenario

Kessel, C.E. (Princeton Plasma Physics Laboratory, Princeton, NJ, United States); Wolfe, S.M.; Hutchinson, I.H.; Hughes, J.W.; Lin, Y.; Ma, Y.; Mikkelsen, D.R.; Poli, F.M.; Reinke, M.L.; Wukitch, S.J. **Source:** *Nuclear Fusion*, v 53, n 9, September 2013

Turbulent impurity transport modeling for Alcator C-Mod

Fu, X.R. (Institute for Fusion Studies, University of Texas at Austin, Austin, TX 78712, United States); Horton, W.; Bespamyatnov, I.O.; Rowan, W.L.; Benkadda, S.; Fiore, C.L.; Futatani, S.; Liao, K.T. **Source:** *Journal of Plasma Physics*, v 79, n 5, p 837-846, October 2013

Rapid shutdown experiments with one and two gas jets on Alcator C-Mod

Olynyk, G.M. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Granetz, R.S.; Reinke, M.L.; Whyte, D.G.; Golfinopoulos, T.; Hughes, J.W.; Walk, J.R.; Izzo, V.A.; Combs, S.K.; Milora, S.L.; Brookman, M.W. **Source:** *Nuclear Fusion*, v 53, n 9, September 2013

Effects of LHRF on toroidal rotation in Alcator C-Mod plasmas

Rice, J.E. (PSFC, MIT, Cambridge, MA 02139, United States); Podpaly, Y.A.; Reinke, M.L.; Gao, C.; Shiraiwa, S.; Terry, J.L.; Theiler, C.; Wallace, G.M.; Bonoli, P.T.; Brunner, D.; Churchill, R.M.; Cziegler, I.; Delgado-Aparicio, L.; Diamond, P.H.; Faust, I.C.; Fisch, N.J.; Granetz, R.S.; Greenwald, M.J.; Hubbard, A.E.; Hughes, J.W.; Hutchinson, I.H.; Irby, J.H.; Lee, J.; Lin, Y.; Marmar, E.S.; Mumgaard, R.; Parker, R.R.; Scott, S.D.; Walk, J.R.; Wolfe, S.M.; Wukitch, S.J. **Source:** *Nuclear Fusion*, v 53, n 9, September 2013

Comparison of edge turbulence imaging at two different poloidal locations in the scrape-off layer of Alcator C-Mod

Zweben, S.J. (Princeton Plasma Phys. Lab., Princeton, NJ, United States); Terry, J.L.; Agostini, M.; Davis, W.M.; Diallo, A.; Ellis, R.A.; Golfinopoulos, T.; Grulke, O.; Hughes, J.W.; LaBombard, B.; Landreman, M.; Myra, J.R.; Pace, D.C.; Stotler, D.P. **Source:** *Physics of Plasmas*, v 20, n 7, p 072503 (18 pp.), July 2013

Changes in core electron temperature fluctuations across the ohmic energy confinement transition in Alcator C-mod plasmas

Sung, C. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); White, A.E.; Howard, N.T.; Oi, C.Y.; Rice, J.E.; Gao, C.; Ennever, P.; Porkolab, M.; Parra, F.; Mikkelsen, D.; Ernst, D.; Walk, J.; Hughes, J.W.; Irby, J.; Kasten, C.; Hubbard, A.E.; Greenwald, M.J. **Source:** *Nuclear Fusion*, v 53, n 8, p 083010 (13 pp.), Aug. 2013

An Assessment of ion Temperature Measurements in the Boundary of the Alcator C-mod Tokamak and Implications for ion Fluid heat flux Limiters

Brunner, D. (MIT PSFC, Cambridge, MA, United States); LaBombard, B.; Churchill, R.M.; Hughes, J.; Lipschultz, B.; Ochoukov, R.; Rognlien, T.D.; Theiler, C.; Walk, J.; Umansky, M.V.; Whyte, D. **Source:** *Plasma Physics and Controlled Fusion*, v 55, n 9, p 095010 (14 pp.), Sept. 2013

Advances in lower hybrid current drive technology on Alcator C-Mod

Wallace, G.M. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Shiraiwa, S.; Hillairet, J.; Preynas, M.; Beck, W.; Casey, J.A.; Doody, J.; Faust, I.C.; Fitzgerald, E.; Johnson, D.K.; Kanojia, A.D.; Koert, P.; Lau, C.; Lin, Y.; Leccacorvi, R.; Macgibbon, P.; Meneghini, O.; Murray, R.; Parker, R.R.; Terry, D.R.; Vieira, R.;

Wilson, J.R.; Wukitch, S.; Zhou, L. **Source:** *Nuclear Fusion*, v 53, n 7, July 2013

Effects of ICRF power on SOL density profiles and LH coupling during simultaneous LH and ICRF operation on Alcator C-Mod

Lau, C. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Lin, Y.; Wallace, G.; Wukitch, S.J.; Hanson, G.R.; Labombard, B.; Ochoukov, R.; Shiraiwa, S.; Terry, J. **Source:** *Plasma Physics and Controlled Fusion*, v 55, n 9, p 095003 (13 pp.), Sept. 2013

Comparison of Edge Turbulence Imaging at Two Different Poloidal Locoations in the Scrape-off Layer of Alcator C-Mod

Zweben, S. (Princeton Univ., NJ. Plasma Physics Lab.) **Sponsor:** Department of Energy, Washington, DC. **Report:** PPPL-4864, 64p, Mar 2013

Characterization and performance of a field aligned ion cyclotron range of frequency antenna in Alcator C-Mod

Wukitch, S.J. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Garrett, M.L.; Ochoukov, R.; Terry, J.L.; Hubbard, A.; Labombard, B.; Lau, C.; Lin, Y.; Lipschultz, B.; Miller, D.; Reinke, M.L.; Whyte, D. **Source:** *Physics of Plasmas*, v 20, n 5, p 056117 (8 pp.), May 2013

Parallel transport studies of high-Z impurities in the core of Alcator C-Mod plasmas

Reinke, M.L. (MIT-Plasma Sci. & Fusion Center Cambridge, Cambridge, MA, United States); Hutchinson, I.H.; Rice, J.E.; Greenwald, M.; Howard, N.T.; Hubbard, A.; Hughes, J.W.; Terry, J.L.; Wolfe, S.M. **Source:** *Physics of Plasmas*, v 20, n 5, p 056109 (13 pp.), May 2013

Scanning ion sensitive probe for plasma profile measurements in the boundary of the Alcator C-Mod tokamak

Brunner, D. (PSFC, MIT, Cambridge, MA, United States); LaBombard, B.; Ochoukov, R.; Whyte, D. **Source:** *Review of Scientific Instruments*, v 84, n 5, p 053507 (12 pp.), May 2013

Fluctuating zonal flows in the I-mode regime in Alcator C-Mod

Cziegler, I. (Center for Momentum Transp. & Flow Organ., Univ. of California, San Diego, La Jolla, CA, United States); Diamond, P.H.; Fedorczak, N.; Manz, P.; Tynan, G.R.; Xu, M.; Churchill, R.M.; Hubbard, A.E.; Lipschultz, B.; Sierchio, J.M.; Terry, J.L.; Theiler, C. **Source:** *Physics of Plasmas*, v 20, n 5, p 055904 (9 pp.), May 2013

Multi-channel transport experiments at Alcator C-Mod and comparison with gyrokinetic simulations

White, A.E. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Howard, N.T.; Greenwald, M.; Reinke, M.L.; Sung, C.; Baek, S.; Barnes, M.; Candy, J.; Dominguez, A.; Ernst, D.; Gao, C.; Hubbard, A.E.; Hughes, J.W.; Lin, Y.; Mikkelsen, D.; Parra, F.; Porkolab, M.; Rice, J.E.; Walk, J.; Wukitch, S.J. **Source:** *Physics of Plasmas*, v 20, n 5, p 056106 (11 pp.), May 2013

Intermittent fluctuations in the Alcator C-Mod scrape-off layer

Garcia, O.E. (Dept. of Phys. & Technol., Univ. of Tromso, Tromso, Norway); Fritzner, S.M.; Kube, R.; Cziegler, I.; LaBombard, B.; Terry, J.L. **Source:** *Physics of Plasmas*, v 20, n 5, p 055901 (7 pp.), May 2013

On the formation and stability of long-lived impurity-ion snakes in Alcator C-Mod

Delgado-Aparicio, L. (Princeton Plasma Phys. Lab., Princeton, NJ, United States); Sugiyama, L.; Granetz, R.; Gates, D.; Rice, J.; Reinke, M.L.; Bergerson, W.; Bitter, M.; Brower, D.L.; Fredrickson, E.; Gao, C.; Greenwald, M.; Hill, K.; Hubbard, A.; Irby, J.; Hughes, J.W.; Marmar, E.; Pablant, N.; Scott, S.; Wilson, R.; Wolfe, S.; Wukitch, S. **Source:** *Nuclear Fusion*, v 53, n 4, p 043019 (15 pp.), April 2013

Modeling far-field radio-frequency sheaths in Alcator C-Mod

D'Ippolito, D.A. (Lodestar Res. Corp., Boulder, CO, United States); Myra, J.R.; Ochoukov, R.; Whyte, D.G. **Source:** *Plasma Physics and Controlled Fusion*, v 55, n 8, p 085001 (9 pp.), Aug. 2013

Measurements of ion Cyclotron Parametric Decay of Lower Hybrid Waves at the High-field side of Alcator C-mod

Baek, S.G. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Parker, R.R.; Shiraiwa, S.; Wallace, G.M.; Bonoli, P.T.; Brunner, D.; Faust, I.C.; Hubbard, A.E.; LaBombard, B.; Porkolab, M. **Source:** *Plasma Physics and Controlled Fusion*, v 55, n 5, p 052001 (8 pp.), May 2013

Pedestal Structure and Stability in H-mode and I-mode: a Comparative Study on Alcator C-mod

Hughes, J.W. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Snyder, P.B.; Walk, J.R.; Davis, E.M.; Diallo, A.; LaBombard, B.; Baek, S.G.; Churchill, R.M.; Greenwald, M.; Groebner, R.J.; Hubbard, A.E.; Lipschultz, B.; Marmar, E.S.; Osborne, T.; Reinke, M.L.; Rice, J.E.; Theiler, C.; Terry, J.; White, A.E.; Whyte, D.G.; Wolfe, S.; Xu, X.Q. **Source:** *Nuclear Fusion*, v 53, n 4, p 043016 (8 pp.), April 2013

Investigation of the transport shortfall in Alcator C-Mod L-mode plasmas

Howard, N.T. (MIT-Plasma Sci. & Fusion Center, Cambridge, MA, United States); White, A.E.; Greenwald, M.; Reinke, M.L.; Walk, J.; Holland, C.; Candy, J.; Go¨rler, T. **Source:** *Physics of Plasmas*, v 20, n 3, p 032510 (5 pp.), March 2013

Scanning retarding field analyzer for plasma profile measurements in the boundary of the Alcator C-Mod tokamak

Brunner, D. (MIT PSFC Cambridge, Cambridge, MA, United States); LaBombard, B.; Ochoukov, R.; Whyte, D. **Source:** *Review of Scientific Instruments*, v 84, n 3, p 033502 (14 pp.), March 2013

Non-neoclassical up/down asymmetry of impurity emission on Alcator C-Mod

Reinke, M.L. (MIT-Plasma Sci. & Fusion Center, Cambridge, MA, United States); Rice, J.E.; Hutchinson, I.H.; Greenwald, M.; Howard, N.T.; Hughes, J.W.; Irby, J.; Podpaly, Y.; Terry, J.L.; White, A. **Source:** *Nuclear Fusion*, v 53, n 4, p 043006 (10 pp.), April 2013

Blob sizes and velocities in the Alcator C-Mod scrape-off layer

Kube, R. (Department of Physics and Technology, University of Troms, N-9037 Troms, Norway); Garcia, O.E.; LaBombard, B.; Terry, J.L.; Zweben, S.J. **Source:** *Journal of Nuclear Materials*, v 438, n SUPPL, p S505-S508, 2013

Burst statistics in Alcator C-Mod SOL turbulence

Garcia, O.E. (MIT Plasma Science and Fusion Center, Cambridge, 02139 MA, United States); Cziegler, I.; Kube, R.; LaBombard, B.; Terry, J.L. **Source:** *Journal of Nuclear Materials*, v 438, n SUPPL, p S180-S183, 2013

Heat-flux footprints for I-mode and EDA H-mode plasmas on Alcator C-Mod

Terry, J.L. (Plasma Science and Fusion Center, MIT, 175 Albany St., Cambridge, MA 02139, United States); LaBombard, B.; Brunner, D.; Hughes, J.W.; Reinke, M.L.; Whyte, D.G. **Source:** *Journal of Nuclear Materials*, v 438, n SUPPL, p S212-S215, 2013

Non-local heat Transport, Rotation Reversals and Up/down Impurity Density Asymmetries in Alcator C-mod Ohmic L-mode Plasmas

Rice, J.E. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Gao, C.; Reinke, M.L.; Diamond, P.H.; Howard, N.T.; Sun, H.J.; Cziegler, I.; Hubbard, A.E.; Podpaly, Y.A.; Rowan, W.L.; Terry, J.L.; Chilenski, M.A.; Delgado-Aparicio, L.; Ennever, P.C.; Ernst, D.; Greenwald, M.J.; Hughes, J.W.; Ma, Y.; Marmar, E.S.; Porkolab, M.; White, A.E.; Wolfe, S.M. **Source:** *Nuclear Fusion*, v 53, n 3, p 033004 (13 pp.), March 2013

Comparison of tungsten nano-tendrils grown in Alcator C-Mod and linear plasma devices

Wright, G.M. (MIT Plasma Science and Fusion Center, 77 Massachusetts Ave., Cambridge, MA 02139, United States); Brunner, D.; Baldwin, M.J.; Bystrov, K.; Doerner, R.P.; Labombard, B.; Lipschultz, B.; De Temmerman, G.; Terry, J.L.; Whyte, D.G.; Woller, K.B. **Source:** *Journal of Nuclear Materials*, v 438, n SUPPL, p S84-S89, 2013

Investigation of RF-enhanced plasma potentials on Alcator C-Mod

Ochoukov, R. (PSFC MIT, NW17, 175 Albany Street, Cambridge, MA 02139, United States); Whyte, D.G.; Brunner, D.; Cziegler, I.; LaBombard, B.; Lipschultz, B.; Myra, J.; Terry, J.; Wukitch, S. **Source:** *Journal of Nuclear Materials*, v 438, n SUPPL, p S875-S878, 2013

Effects of LH power on SOL density profiles and LH coupling on Alcator C-Mod

Lau, C. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Hanson, G.R.; Labombard, B.; Lin, Y.; Meneghini, O.; Ochoukov, R.; Parker, R.; Shiraiwa, S.; Terry, J.; Wallace, G.; Wilgen, J.; Wukitch, S.J. **Source:** *Plasma Physics and Controlled Fusion*, v 55, n 2, p 025008 (13 pp.), Feb. 2013

Transport and drift-driven plasma flow components in the Alcator C-Mod boundary plasma

Smick, N. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); LaBombard, B.; Hutchinson, I.H. **Source:** *Nuclear Fusion*, v 53, n 2, p 023001 (26 pp.), Feb. 2013

Active control system upgrade design for lower hybrid current drive system on Alcator C-Mod

Kanojia, A.D. (Massachusetts Inst. of Technol. Plasma Sci. & Fusion Center, Cambridge, MA, United States); Wallace, G.M.; Terry, D.R.; Stillerman, J.A.; Burke, W.M.; MacGibbon, P.A.; Johnson, D.K. **Source:** *Fusion Engineering and Design*, v 87, n 12, p 1981-4, Dec. 2012

Observation of spectral broadening of lower hybrid waves in alcator c-mod

Baek, Seung-Gyou (Plasma Science and Fusion Center, MIT, Cambridge, MA, 02139, United States); Parker, Ronald R.; Lau, Cornwall; Shiraiwa, Syun'ichi; Wallace, Gregory M. **Source:** *Plasma and Fusion Research*, v 7, n SPL.ISS.1, 2012

Study and optimization of boronization in Alcator C-Mod using the Surface Science Station (S3)

Ochoukov, R. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Whyte, D.; Lipschultz, B.; LaBombard, B.; Gierse, N.; Harrison, S. **Source:** *Fusion Engineering and Design*, v 87, n 9, p 1700-7, Sept. 2012

Achieving steady-state regimes with LHCD in Alcator C-Mod

Parker, R.R. (Plasma Science and Fusion Center, MIT, Cambridge, MA, 02139, United States); Bonoli, P.T.; Meneghini, O.; Shiraiwa, S.; Wallace, G.M.; Wilson, J.R.; Baek, S.G.; Faust, I.C.; Harvey, R.W.; Hubbard, A.E.; Smirnov, A.P. **Source:** *39th EPS Conference on Plasma Physics 2012, EPS 2012 and the 16th International Congress on Plasma Physics*, v 2, p 798-801, 2012, *39th EPS Conference on Plasma Physics 2012, EPS 2012 and the 16th International Congress on Plasma Physics*

Simulation study of toroidal flow generation by the ICRF minority heating in the Alcator C-Mod plasma

Murakami, S. (Department of Nuclear Engineering, Kyoto Univ., Kyoto 606-8501, Japan); Itoh, K.; Zheng, L.J.; Van Dam, J.W.; Bonoli, P.; Rice, J.E.; Fiore, C.L.; Gao, C.; Fukuyama, A. **Source:** *39th EPS Conference on Plasma Physics 2012, EPS 2012 and the 16th International Congress on Plasma Physics*, v 1, p 133-136, 2012, *39th EPS Conference on Plasma Physics 2012, EPS 2012 and the 16th International Congress on Plasma Physics*

Stationary density profiles in the Alcator C-mod tokamak

Kesner, J. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Ernst, D.; Hughes, J.; Mumgaard, R.; Scott, S.; Shiraiwa, S.; Whyte, D. **Source:** *Physics of Plasmas*, v 19, n 12, p 122511 (6 pp.), Dec. 2012

Transport and turbulence studies in the linear ohmic confinement regime in Alcator C-Mod

Porkolab, M. (MIT Plasma Science and Fusion Center, Cambridge, MA, United States); Dorris, J.; Ennever, P.; Fiore, C.; Greenwald, M.; Hubbard, A.; Ma, Y.; Marmar, E.; Podpaly, Y.; Reinke, M.L.; Rice, J.E.; Rost, J.C.; Tsujii, N.; Ernst, D.; Candy, J.; Staebler, G.M.; Waltz, R.E. **Source:** *Plasma Physics and Controlled Fusion*, v 54, n 12, December 2012

Novel energy resolving x-ray pinhole camera on Alcator C-Mod

Pablant, N.A. (Princeton Plasma Physics Laboratory, Princeton, NJ 08543, United States); Delgado-Aparicio, L.; Bitter, M.; Brandstetter, S.; Eikenberry, E.; Ellis, R.; Hill, K.W.; Hofer, P.; Schneebeli, M. **Source:** *Review of Scientific Instruments*, v 83, n 10, October 2012

A new interferometry-based electron density fluctuation diagnostic on Alcator C-

Mod

Kasten, C.P. (Massachusetts Institute of Technology, Cambridge, MA 02139, United States); Irby, J.H.; Murray, R.; White, A.E.; Pace, D.C. **Source:** *Review of Scientific Instruments*, v 83, n 10, October 2012

First results of the SOL reflectometer on Alcator C-Mod

Lau, C. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Hanson, G.; Lin, Y.; Wilgen, J.; Wukitch, S.; Labombard, B.; Wallace, G. **Source:** *Review of Scientific Instruments*, v 83, n 10, October 2012

Modification of ordinary-mode reflectometry system to detect lower-hybrid waves in Alcator C-Mod

Baek, S.G. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Shiraiwa, S.; Parker, R.R.; Dominguez, A.; Kramer, G.J.; Marmar, E.S. **Source:** *Review of Scientific Instruments*, v 83, n 10, p 10E325 (3 pp.), Oct. 2012

Survey of the TS-ECE Discrepancy and recent investigations in ICRF heated plasmas at Alcator C-Mod

White, A.E. (Massachusetts Inst. of Technol., Cambridge, MA, United States); Hubbard, A.E.; Hughes, J.W.; Bonoli, P.T.; Austin, M.E.; Bader, A.; Harvey, R.W.; Lin, Y.; Ma, Y.; Reinke, M.L.; Wolfe, S.M.; Wukitch, S.J. **Source:** *EPJ Web of Conferences*, v 32, p 03009 (6 pp.), 2012

Novel energy resolving x-ray pinhole camera on Alcator C-Mod

Pablant, N.A. (Princeton Plasma Phys. Lab., Princeton, NJ, United States); Delgado-Aparicio, L.; Bitter, M.; Brandstetter, S.; Eikenberry, E.; Ellis, R.; Hill, K.W.; Hofer, P.; Schneebeli, M. **Source:** *Review of Scientific Instruments*, v 83, n 10, p 10E526 (3 pp.), Oct. 2012

A new interferometry-based electron density fluctuation diagnostic on Alcator C-Mod

Kasten, C.P. (Massachusetts Inst. of Technol., Cambridge, MA, United States); Irby, J.H.; Murray, R.; White, A.E.; Pace, D.C. **Source:** *Review of Scientific Instruments*, v 83, n 10, p 10E301 (3 pp.), Oct. 2012

First results of the SOL reflectometer on Alcator C-Mod

Lau, C. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Hanson, G.; Lin, Y.; Wilgen, J.; Wukitch, S.; Labombard, B.; Wallace, G. **Source:** *Review of Scientific Instruments*, v 83, n 10, p 10E309 (3 pp.), Oct. 2012

Design of a correlation electron cyclotron emission diagnostic for Alcator C-Mod

Sung, C. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); White, A.E.; Irby, J.H.; Leccacorvi, R.; Vieira, R.; Oi, C.Y.; Peebles, W.A.; Nguyen, X. **Source:** *Review of Scientific Instruments*, v 83, n 10, p 10E311 (3 pp.), Oct. 2012

Molybdenum emission from impurity-induced m = 1 snake-modes on the Alcator C-Mod tokamak

Delgado-Aparicio, L. (Princeton Plasma Phys. Lab., Princeton, NJ, United States); Bitter, M.; Granetz, R.; Reinke, M.; Beiersdorfer, P.; Gates, D.; Hill, K.; Pablant, N.; Podpaly, Y.; Rice, J.; Sugiyama, L. **Source:** *Review of Scientific Instruments*, v 83, n 10, p 10E517 (3 pp.), Oct. 2012

Measurements of ion cyclotron range of frequencies mode converted wave intensity with phase contrast imaging in Alcator C-Mod and comparison with full-wave simulations

Tsujii, N. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Porkolab, M.; Bonoli, P.T.; Lin, Y.; Wright, J.C.; Wukitch, S.J.; Jaeger, E.F.; Green, D.L.; Harvey, R.W. **Source:** *Physics of Plasmas*, v 19, n 8, p 082508 (13 pp.), Aug. 2012

Numerical investigation of edge plasma phenomena in an enhanced D-alpha discharge at Alcator C-Mod: parallel heat flux and quasi-coherent edge oscillations

Russell, D.A. (Lodestar Res. Corp., Boulder, CO, United States); D'Ippolito, D.A.; Myra, J.R.; LaBombard, B.; Terry, J.L.; Zweben, S.J. **Source:** *Physics of Plasmas*, v 19, n 8, p 082311 (9 pp.), Aug. 2012

Experimental measurements of ion cyclotron range of frequency minority-heated fast-ion distributions on Alcator C-Mod

Bader, A. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Granetz, R.S.; Parker, R.R.; Bonoli, P.T.; Hutchinson, I.H.; Sears, J.; Wukitch, S.J. **Source:** *Nuclear Fusion*, v 52, n 9, p 094019 (8 pp.), Sept. 2012

Energetic ion loss detector on the Alcator C-Mod tokamak

Pace, D.C. (Oak Ridge Inst. for Sci. & Educ., Oak Ridge, TN, United States); Granetz, R.S.; Vieira, R.; Bader, A.; Bosco, J.; Darrow, D.S.; Fiore, C.; Irby, J.; Parker, R.R.; Parkin, W.; Reinke, M.L.; Terry, J.L.; Wolfe, S.M.; Wukitch, S.J.; Zweben, S.J. **Source:** *Review of Scientific Instruments*, v 83, n 7, p 073501 (8 pp.), July 2012

H-mode power threshold reduction in a slot-divertor configuration on the Alcator C-Mod tokamak

Ma, Y. (Massachusetts Institute of Technology, Plasma Science and Fusion Center, 175

Albany Street, Cambridge, MA 02139, United States); Hughes, J.W.; Hubbard, A.E.; Labombard, B.; Terry, J. **Source:** *Plasma Physics and Controlled Fusion*, v 54, n 8, August 2012

Neoclassical Theory of Pedestal Flows and Comparison with Alcator C-Mod Measurements

Kagan, G. (Los Alamos Nat. Lab., Los Alamos, NM, United States); Marr, K.D.; Pusztai, I.; Landreman, M.; Catto, P.J.; Lipschultz, B. **Source:** *Contributions to Plasma Physics*, v 52, n 5-6, p 365-71, June 2012

Investigation of the Thomson scattering-ECE discrepancy in ICRF heated plasmas at Alcator C-Mod

White, A.E. (Massachusetts Inst. of Technol. (ORISE), Cambridge, MA, United States); Hubbard, A.E.; Hughes, J.W.; Bonoli, P.T.; Austin, M.E.; Bader, A.; Harvey, R.W.; Lin, Y.; Ma, Y.; Reinke, M.L.; Wolfe, S.M.; Wukitch, S.J. **Source:** *Nuclear Fusion*, v 52, n 6, p 063021 (8 pp.), June 2012

Ohmic energy confinement saturation and core toroidal rotation reversal in Alcator C-Mod plasmas

Rice, J.E. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Greenwald, M.J.; Podpaly, Y.A.; Reinke, M.L.; Diamond, P.H.; Hughes, J.W.; Howard, N.T.; Ma, Y.; Cziegler, I.; Duval, B.P.; Ennever, P.C.; Ernst, D.; Fiore, C.L.; Gao, C.; Irby, J.H.; Marmar, E.S.; Porkolab, M.; Tsujii, N.; Wolfe, S.M. **Source:** *Physics of Plasmas*, v 19, n 5, p 056106 (7 pp.), May 2012

Production of internal transport barriers via self-generated mean flows in Alcator C-Mod

Fiore, C.L. (MIT-PSFC, Cambridge, MA, United States); Ernst, D.R.; Podpaly, Y.A.; Mikkelsen, D.; Howard, N.T.; Jungpyo Lee; Reinke, M.L.; Rice, J.E.; Hughes, J.W.; Ma, Y.; Rowan, W.L.; Bespamyatnov, I. **Source:** *Physics of Plasmas*, v 19, n 5, p 056113 (7 pp.), May 2012

Tungsten nano-tendril growth in the Alcator C-Mod divertor

Wright, G.M. (MIT Plasma Science and Fusion Center, 77 Massachusetts Ave, Cambridge, 02139, MA, United States); Brunner, D.; Baldwin, M.J.; Doerner, R.P.; Labombard, B.; Lipschultz, B.; Terry, J.L.; Whyte, D.G. **Source:** *Nuclear Fusion*, v 52, n 4, April 2012

Quantitative Comparison of Experimental Impurity Transport with Nonlinear Gyrokinetic Simulation in an Alcator C-mod L-mode Plasma

Howard, N.T. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Greenwald, M.; Mikkelsen, D.R.; Reinke, M.L.; White, A.E.; Ernst, D.; Podpaly, Y.;

Candy, J. **Source:** *Nuclear Fusion*, v 52, n 6, p 063002 (12 pp.), June 2012

Characterization of the pedestal in Alcator C-Mod ELMing H-modes and comparison with the EPED model

Walk, J.R. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Snyder, P.B.; Hughes, J.W.; Terry, J.L.; Hubbard, A.E.; Phillips, P.E. **Source:** *Nuclear Fusion*, v 52, n 6, p 063011 (12 pp.), June 2012

Surface thermocouples for measurement of pulsed heat flux in the divertor of the Alcator C-Mod tokamak

Brunner, D. (MIT PSFC, Cambridge, MA, United States); LaBombard, B. **Source:** *Review of Scientific Instruments*, v 83, n 3, p 033501 (7 pp.), March 2012

Poloidal Variation of High-Z impurity density due to hydrogen minority ion cyclotron resonance heating on Alcator C-Mod

Reinke, M.L. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Hutchinson, I.H.; Rice, J.E.; Howard, N.T.; Bader, A.; Wukitch, S.; Lin, Y.; Pace, D.C.; Hubbard, A.; Hughes, J.W.; Podpaly, Y. **Source:** *Plasma Physics and Controlled Fusion*, v 54, n 4, p 045004 (9 pp.), April 2012

Scaling of H-mode Threshold Power and L-H edge Conditions with Favourable ion Grad-B drift in Alcator C-Mod tokamak

Ma, Y. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Hughes, J.W.; Hubbard, A.E.; LaBombard, B.; Churchill, R.M.; Golfinopolous, T.; Tsujii, N.; Marmar, E.S. **Source:** *Nuclear Fusion*, v 52, n 2, p 023010 (17 pp.), Feb. 2012

Search for zonal flows in the edge turbulence of Alcator C-mod

Zweben, S.J. (Princeton Plasma Phys. Lab., Princeton, NJ, United States); Terry, J.L.; Agostini, M.; Hager, R.; Hughes, J.W.; Myra, J.R.; Pace, D.C. **Source:** *Plasma Physics and Controlled Fusion*, v 54, n 2, p 025008 (21 pp.), Feb. 2012 **Edge zonal flows and blob propagation in Alcator C-Mod**

Zweben, S.J. (Princeton Plasma Physics Laboratory, Princeton NJ 08540, United States); Terry, J.L.; Agostini, M.; Davis, B.; Grulke, O.; Hager, R.; Hughes, J.; Labombard, B.; D'Ippolito, D.A.; Myra, J.R.; Russell, D.A. **Source:** *38th EPS Conference on Plasma Physics 2011, EPS 2011 - Europhysics Conference Abstracts*, v 35 2, p 1608-1611, 2011, *38th EPS Conference on Plasma Physics 2011, EPS 2011 - Europhysics Conference Abstracts*

Formation, stability and momentum transport characteristics of impurity-induced

snakes in Alcator C-Mod

Delgado-Aparicio, L. (Princeton Plasma Physics Laboratory, Princeton, NJ, United States); Granetz, R.; Rice, J.; Podpaly, Y.A.; Reinke, M.L.; Bitter, M.; Fredrickson, E.; Gates, D.; Greenwald, M.; Hill, K.; Marmar, E.; Pablant, N.A.; Scott, S.; Wilson, R.; Wolfe, S. **Source:** *38th EPS Conference on Plasma Physics 2011, EPS 2011 - Europhysics Conference Abstracts*, v 35 1, p 425-428, 2011, *38th EPS Conference on Plasma Physics 2011, EPS 2011 - Europhysics Conference Abstracts*

Validation of the LHEAF code against Alcator C-Mod LHCD discharges

Meneghini, O. (MIT Plasma Science and Fusion Centers, Cambridge, MA, United States); Shiraiwa, S.; Faust, I.; Parker, R.R.; Wallace, G. **Source:** *38th EPS Conference on Plasma Physics 2011, EPS 2011 - Europhysics Conference Abstracts*, v 35 1, p 917-920, 2011, *38th EPS Conference on Plasma Physics 2011, EPS 2011 - Europhysics Conference Abstracts*

Lower hybrid current drive at high density on Alcator C-Mod

Wallace, G.M. (MIT Plasma Science and Fusion Center, Cambridge, United States); Bonoli, P.T.; Faust, I.C.; Harvey, R.W.; Hubbard, A.E.; Labombard, B.L.; Lipschultz, B.; Lau, C.; Meneghini, O.; Mumgaard, R.; Parker, R.R.; Reinke, M.L.; Schmidt, A.E.; Scott, S.D.; Shiraiwa, S.; Smirnov, A.P.; Terry, J.L.; Whyte, D.G.; Wilson, J.R.; Wright, J.C.; Wukitch, S.J. **Source:** *38th EPS Conference on Plasma Physics 2011, EPS 2011 - Europhysics Conference Abstracts*, v 35 2, p 1696-1699, 2011, *38th EPS Conference on Plasma Physics 2011, EPS 2011 - Europhysics Conference Abstracts*

LHCD driven reversed shear plasmas on Alcator C-Mod

Shiraiwa, S. (Plasma Science Fusion Center, MIT, MA, United States); Bonoli, P.T.; Faust, I.; Hubbard, A.; Meneghini, O.; Parker, R.R.; Schmidt, A.E.; Wallace, G.M.; Wilson, J.R.; Scott, S.; Mumgaard, R. **Source:** *38th EPS Conference on Plasma Physics 2011, EPS 2011 - Europhysics Conference Abstracts*, v 35 2, p 1676-1679, 2011, *38th EPS Conference on Plasma Physics 2011, EPS 2011 - Europhysics Conference Abstracts*

Turbulent transport studies in alcator C-Mod ohmic plasmas

Porkolab, M. (MIT Plasma Science and Fusion Center, Cambridge, MA, United States); Dorris, J.; Ennever, P.; Fiore, C.; Hubbard, A.; Greenwald, M.; Ma, Y.; Podpaly, Y.; Reinke, M.L.; Rice, J.; Rost, J.C.; Tsujii, N.; Candy, J.; Staebler, G.M.; Waltz, R.; Diamond, P. **Source:** *38th EPS Conference on Plasma Physics 2011, EPS 2011 - Europhysics Conference Abstracts*, v 35 2, p 1724-1727, 2011, *38th EPS Conference on Plasma Physics 2011, EPS 2011 - Europhysics Conference Abstracts*

Divertor heat flux footprints in EDA H-mode discharges on Alcator C-Mod

LaBombard, B. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Terry, J.L.; Hughes, J.W.; Brunner, D.; Payne, J.; Reinke, M.L.; Lin, Y.; Wukitch, S. **Source:** *Journal of Nuclear Materials*, v 415, n 1, p S349-52, 1 Aug. 2011

Interpretation and implementation of an ion sensitive probe as a plasma potential diagnostic on Alcator C-Mod

Ochoukov, R. (PSFC, MIT, Cambridge, MA, United States); Whyte, D.G.; Lipschultz, B.; LaBombard, B.; Wukitch, S. **Source:** *Journal of Nuclear Materials*, v 415, n 1, p S1143-6, 1 Aug. 2011

Estimate of convective radial transport due to SOL turbulence as measured by GPI in Alcator C-Mod

Zweben, S.J. (PPPL, Princeton, NJ, United States); Terry, J.L.; LaBombard, B.; Agostini, M.; Greenwald, M.; Grulke, O.; Hughes, J.W.; D'Ippolito, D.A.; Krasheninnikov, S.I.; Myra, J.R.; Russell, D.A.; Stotler, D.P.; Umansky, M. **Source:** *Journal of Nuclear Materials*, v 415, n 1, p S463-6, 1 Aug. 2011

Comparison of heat flux measurements by IR thermography and probes in the Alcator C-Mod divertor

Brunner, D. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); LaBombard, B.; Payne, J.; Terry, J.L. **Source:** *Journal of Nuclear Materials*, v 415, n 1, p S375-8, 1 Aug. 2011

The scaling of fuel recovered following un-mitigated disruptions in Alcator C-Mod with high-Z PFCs

Lipschultz, B. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Whyte, D.G.; Granetz, R.S.; Loarte, A.; Reinke, M.L.; Wolfe, S.M. **Source:** *Journal of Nuclear Materials*, v 415, n 1, p S813-16, 1 Aug. 2011

A study of tungsten migration in the Alcator C-Mod divertor

Barnard, H.S. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Lipschultz, B.; Whyte, D.G. **Source:** *Journal of Nuclear Materials*, v 415, n 1, p S301-4, 1 Aug. 2011

Effect of N2, Ne and Ar seeding on Alcator C-Mod H-mode confinement

Reinke, M.L. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Hughes, J.W.; Loarte, A.; Brunner, D.; Hutchinson, I.H.; LaBombard, B.; Payne, J.; Terry, J.L. **Source:** *Journal of Nuclear Materials*, v 415, n 1, p S340-44, 1 Aug. 2011

Fullwave simulations of lower hybrid waves coupled to 3D Fokker-Planck solver: comparison with Alcator C-Mod experiment

Meneghini, O. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Shiraiwa, S.; Faust, I.; Parker, R.R.; Schmidt, A.; Wallace, G. **Source:** *Fusion Science and Technology*, v 60, n 1T, p 40-7, July 2011

High confinement/high radiated power H-mode experiments in Alcator C-Mod and consequences for International Thermonuclear Experimental Reactor (ITER) QDT = 10 operation

Loarte, A. (ITER Organ., St. Paul-lez-Durance, France); Hughes, J.W.; Reinke, M.L.; Terry, J.L.; LaBombard, B.; Brunner, D.; Greenwald, M.; Lipschultz, B.; Ma, Y.; Wukitch, S.; Wolfe, S. **Source:** *Physics of Plasmas*, v 18, n 5, p 056105 (13 pp.), May 2011

Scaling of the power exhaust channel in Alcator C-Mod

LaBombard, B. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Terry, J.L.; Hughes, J.W.; Brunner, D.; Payne, J.; Reinke, M.L.; Cziegler, I.; Granetz, R.; Greenwald, M.; Hutchinson, I.H.; Irby, J.; Lin, Y.; Lipschultz, B.; Ma, Y.; Marmar, E.S.; Rowan, W.L.; Tsujii, N.; Wallace, G.; Whyte, D.G.; Wolfe, S.; Wukitch, S.; Wurden, G. **Source:** *Physics of Plasmas*, v 18, n 5, p 056104 (14 pp.), May 2011

Investigation of lower hybrid physics through power modulation experiments on Alcator C-Mod

Schmidt, A. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Bonoli, P.T.; Meneghini, O.; Parker, R.R.; Porkolab, M.; Shiraiwa, S.; Wallace, G.; Wright, J.C.; Harvey, R.W.; Wilson, J.R. **Source:** *Physics of Plasmas*, v 18, n 5, p 056122 (8 pp.), May 2011

Edge energy transport barrier and turbulence in the I-mode regime on Alcator C-Mod

Hubbard, A.E. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Whyte, D.G.; Churchill, R.M.; Cziegler, I.; Dominguez, A.; Golfinopoulos, T.; Hughes, J.W.; Rice, J.E.; Bespamyatnov, I.; Greenwald, M.J.; Howard, N.; Lipschultz, B.; Marmar, E.S.; Reinke, M.L.; Rowan, W.L.; Terry, J.L. **Source:** *Physics of Plasmas*, v 18, n 5, p 056115 (9 pp.), May 2011

Measurement of lower hybrid waves in scrape off layer using microwave scattering technique in Alcator C-Mod

Baek, S.G. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Parker, R.R.; Shiraiwa, S.; Dominguez, A.; Wallace, G.; Marmar, E.S.; Kramer, G.J. **Source:** *AIP Conference Proceedings*, v 1406, p 235-8, 2011

Fast-ions on Alcator C-Mod: Comparisons between Simulation and Experiment for Equilibrium and Evolving Distributions

Bader, A. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Bonoli,

P.T.; Granetz, R.S.; Harvey, R.W.; Jaeger, E.F.; Parker, R.; Wukitch, S.J. **Source:** *AIP Conference Proceedings*, v 1406, p 357-60, 2011

SOL Effects on LH Wave Coupling and Current Drive Performance on Alcator C-Mod

Meneghini, O. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Lau, C.; Shiraiwa, S.; Wallace, G.M.; Parker, R.R.; LaBombard, B.L.; Faust, I.C.; Wilson, J.R.; Wukitch, S.J. **Source:** *AIP Conference Proceedings*, v 1406, p 411-18, 2011

Minority Ion Measurements During ICRF Experiments in Alcator C-Mod

Liao, K.T. (Inst. for Fusion Studies, Univ. of Texas at Austin, Austin, TX, United States); Rowan, W.L.; Bespamyatnov, I.O.; Wukitch, S.J.; Lin, Y.; Bader, A.; Tsujii, N. **Source:** *AIP Conference Proceedings*, v 1406, p 361-4, 2011

ICRF Mode Conversion Flow Drive Experiments on Alcator C-Mod

Lin, Y. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Reinke, M.L.; Rice, J.E.; Wukitch, S.J.; Granetz, R.; Greenwald, M.; Hubbard, A.E.; Marmar, E.S.; Podpaly, Y.A.; Porkolab, M.; Tsujii, N.; Wolfe, S. **Source:** *AIP Conference Proceedings*, v 1406, p 285-8, 2011

Estimation of the ion toroidal rotation source due to momentum transfer from Lower Hybrid waves in Alcator C-Mod

Lee, J.P. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Wright, J.C.; Bonoli, P.T.; Parker, R.R.; Catto, P.J.; Podpaly, Y.A.; Rice, J.E.; Reinke, M.L. **Source:** *AIP Conference Proceedings*, v 1406, p 459-62, 2011

Observation of Co and Counter Rotation Produced by Lower Hybrid Waves in Alcator C-Mod

Parker, R.R. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Podpaly, Y.; Lee, J.; Reinke, M.L.; Rice, J.E.; Bonoli, P.T.; Meneghini, O.; Shiraiwa, S.; Wallace, G.M.; Wilson, J.R. **Source:** *AIP Conference Proceedings*, v 1406, p 455-8, 2011

Lower Hybrid Wave Induced SOL Emissivity Variation at High Density on the Alcator C-Mod Tokamak

Faust, I. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Terry, J.L.; Reinke, M.L.; Meneghini, O.; Shiraiwa, S.; Wallace, G.M.; Parker, R.R.; Schmidt, A.E.; Wilson, J.R. **Source:** *AIP Conference Proceedings*, v 1406, p 231-4, 2011

Progress in LHCD modeling and experiments towards the AT regime on Alcator

C-Mod

Shiraiwa, S. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Bonoli, P.T.; Faust, I.; Meneghini, O.; Hubbard, A.; Parker, R.R.; Schmidt, A.E.; Wallace, G.M.; Hughes, J.W.; Mumgaard, R.; Scott, S.; Wilson, J.R.; Harvey, R.W.; Smirnov, A.P. **Source:** *AIP Conference Proceedings*, v 1406, p 439-42, 2011

Effects of ICRF and LHCD on SOL Density Profiles on Alcator C-Mod

Lau, C. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Hanson, G.; Lin, Y.; Meneghini, O.; Wukitch, S.; Labombard, B.; Parker, R.; Shiraiwa, S.; Wallace, G.; Wilgen, J. **Source:** *AIP Conference Proceedings*, v 1406, p 227-30, 2011

Experimental Investigation of RF Sheath Rectification in ICRF and LH Heated Plasmas on Alcator C-Mod

Ochoukov, R. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Whyte, D.G.; Faust, I.; LaBombard, B.; Lipschultz, B.; Meneghini, O.; Myra, J.; Wallace, G.; Wukitch, S. **Source:** *AIP Conference Proceedings*, v 1406, p 207-10, 2011

Design, and initial experiment results of a novel LH launcher on Alcator C-Mod

Shiraiwa, S. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Meneghini, O.; Parker, R.R.; Wallace, G.; Wilson, J.; Faust, I.; Lau, C.; Mumgaard, R.; Scott, S.; Wukitch, S.; Beck, W.; Doody, J.; Irby, J.; MacGibbon, P.; Johnson, D.; Kanojia, A.; Koert, P.; Terry, D.; Vieira, R. **Source:** *Nuclear Fusion*, v 51, n 10, p 103024 (9 pp.), Oct. 2011

The Ar17+ Lyα2/Lyα1 ratio in Alcator C-Mod tokamak plasmas

Rice, J.E. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Reinke, M.L.; Ashbourn, J.M.A.; Ince-Cushman, A.C.; Podpaly, Y.A.; Gu, M.F.; Bitter, M.; Hill, K.; Rachlew, E. **Source:** *Journal of Physics B: Atomic, Molecular and Optical Physics*, v 44, n 16, p 165702 (6 pp.), 28 Aug. 2011

Erratum: A visible spectral survey from the Alcator C-Mod tokamak (Canadian Journal of Physics (2011) 89 (615-626))

Graf, Alexander T. (Lawrence Livermore National Laboratory, L-490, 7000 East Ave, Livermore, CA 94550, United States); May, Mark J.; Beiersdorfer, Peter **Source:** *Canadian Journal of Physics*, v 89, n 7, p 825, July 2011

Measuring plasma impurities in Alcator C-Mod as a function of time in the extreme ultraviolet

Beiersdorfer, P. (Lawrence Livermore National Laboratory, Livermore, CA 94550, United States); Brown, G.V.; Kamp, J.B.; Magee, E.W.; Lepson, J.K.; Podpaly, Y.; Reinke, M.L. **Source:** *Canadian Journal of Physics*, v 89, n 5, p 653-656, May 2011

A visible spectral survey from the Alcator C-Mod tokamak

Graf, A.T. (Lawrence Livermore National Laboratory, L-490, 7000 East Ave., Livermore, CA 94550, United States); May, M.J.; Beiersdorfer, P. **Source:** *Canadian Journal of Physics*, v 89, n 5, p 615-626, May 2011

Tungsten measurement on Alcator C-Mod and EBIT for future fusion reactors

Podpaly, Y.A. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Rice, J.E.; Beiersdorfer, P.; Reinke, M.L.; Clementson, J.; Barnard, H.S. **Source:** *Canadian Journal of Physics*, v 89, n 5, p 591-597, May 2011

Lower Hybrid Current Drive at high Density in Alcator C-mod

Wallace, G.M. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Hubbard, A.E.; Bonoli, P.T.; Faust, I.C.; Harvey, R.W.; Hughes, J.W.; LaBombard, B.L.; Meneghini, O.; Parker, R.R.; Schmidt, A.E.; Shiraiwa, S.; Smirnov, A.P.; Whyte, D.G.; Wilson, J.R.; Wright, J.C.; Wukitch, S.J. **Source:** *Nuclear Fusion*, v 51, n 8, p 083032 (9 pp.), Aug. 2011

Characterization of impurity confinement on Alcator C-Mod using a multi-pulse laser blow-off system

Howard, N.T. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Greenwald, M.; Rice, J.E. **Source:** *Review of Scientific Instruments*, v 82, n 3, p 033512 (5 pp.), March 2011

Power Requirements for Superior H-mode Confinement on Alcator C-mod: Experiments in Support of Iter

Hughes, J.W. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Loarte, A.; Reinke, M.L.; Terry, J.L.; Brunner, D.; Greenwald, M.; Hubbard, A.E.; LaBombard, B.; Lipschultz, B.; Ma, Y.; Wolfe, S.; Wukitch, S.J. **Source:** *Nuclear Fusion*, v 51, n 8, p 083007 (8 pp.), Aug. 2011

Observations of core Toroidal Rotation Reversals in Alcator C-mod Ohmic L-mode Plasmas

Rice, J.E. (Centre de Recherches en Phys. des Plasmas, Ecole Polytech. Fed. de Lausanne, Lausanne, Switzerland); Duval, B.P.; Reinke, M.L.; Podpaly, Y.A.; Bortolon, A.; Churchill, R.M.; Cziegler, I.; Diamond, P.H.; Dominguez, A.; Ennever, P.C.; Fiore, C.L.; Granetz, R.S.; Greenwald, M.J.; Hubbard, A.E.; Hughes, J.W.; Irby, J.H.; Ma, Y.;

Marmar, E.S.; McDermott, R.M.; Porkolab, M.; Tsujii, N.; Wolfe, S.M. **Source:** *Nuclear Fusion*, v 51, n 8, p 083005 (12 pp.), Aug. 2011

Edge Temperature Gradient as Intrinsic Rotation Drive in Alcator C-Mod Tokamak Plasmas

Rice, J.E. (PSFC, MIT, Cambridge, MA, United States); Hughes, J.W.; Diamond, P.H.; Kosuga, Y.; Podpaly, Y.A.; Reinke, M.L.; Greenwald, M.J.; Gu¨rcan, O.D.; Hahm, T.S.; Hubbard, A.E.; Marmar, E.S.; McDevitt, C.J.; Whyte, D.G. **Source:** *Physical Review Letters*, v 106, n 21, p 215001 (4 pp.), 27 May 2011

Runaway Electron Confinement Modelling for Rapid Shutdown Scenarios in DIII-D, Alcator C-Mod and ITER

Izzo, V.A. (Center for Energy Res., Univ. of California at San Diego, La Jolla, CA, United States); Hollmann, E.M.; James, A.N.; Yu, J.H.; Humphreys, D.A.; Lao, L.L.; Parks, P.B.; Sieck, P.E.; Wesley, J.C.; Granetz, R.S.; Olynyk, G.M.; Whyte, D.G. **Source:** *Nuclear Fusion*, v 51, n 6, p 063032 (10 pp.), June 2011

Comparison of small ELM characteristics and regimes in Alcator C-Mod, MAST and NSTX

Maingi, R. (Oak Ridge Nat. Lab., Oak Ridge, TN, United States); Hubbard, A.E.; Meyer, H.; Hughes, J.W.; Kirk, A.; Maqueda, R.; Terry, J.L. **Source:** *Nuclear Fusion*, v 51, n 6, p 063036 (11 pp.), June 2011

ICRF mode conversion flow drive on Alcator C-Mod

Lin, Y. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Rice, J.E.; Wukitch, S.J.; Reinke, M.L.; Greenwald, M.J.; Hubbard, A.E.; Marmar, E.S.; Podpaly, Y.; Porkolab, M.; Tsujii, N. **Source:** *Nuclear Fusion*, v 51, n 6, p 063002 (12 pp.), June 2011

Using Mixed Gases for Massive gas Injection Disruption Mitigation on Alcator C-mod

Bakhtiari, M. (Fusion Technol. Inst., Univ. of Wisconsin-Madison, Madison, WI, United States); Olynyk, G.; Granetz, R.; Whyte, D.G.; Reinke, M.L.; Zhurovich, K.; Izzo, V. **Source:** *Nuclear Fusion*, v 51, n 6, p 063007 (9 pp.), June 2011

Edge Turbulence in Different Density Regimes in Alcator C-mod Experiment

Agostini, M. (Consorzio RFX, Associazione EURATOM-Enea sulla fusione, Padova, Italy); Terry, J.L.; Scarin, P.; Zweben, S.J. **Source:** *Nuclear Fusion*, v 51, n 5, p 053020 (9 pp.), May 2011

Microwave probe diagnostic for the lower hybrid four-way-splitter antenna on Alcator C-Mod

Meneghini, O. (MIT Plasma Science and Fusion Center, Cambridge, MA, United States); Faust, I.; Johnson, D.; Parker, R.; Terry, D.; Vieira, R.; Wallace, G.; Wukitch, S. **Source:** *37th EPS Conference on Plasma Physics 2010, EPS 2010*, v 3, p 1832-1835, 2010, *37th EPS Conference on Plasma Physics 2010, EPS 2010*

Parallel correlation of turbulent fluctuations in the SOL of Alcator C-Mod

Grulke, O. (MPI for Plasma Physics, EURATOM Association, Greifswald, Germany); Terry, J.L.; Labombard, B.; Cziegler, I.; Zweben, S.J. **Source:** *37th EPS Conference on Plasma Physics 2010, EPS 2010*, v 1, p 369-372, 2010, *37th EPS Conference on Plasma Physics 2010, EPS 2010*

Parameter scalings of ICRF mode conversion flow drive in Alcator C-Mod plasmas

Rice, J.E. (MIT PSFC, Cambridge, United States); Lin, Y.; Wukitch, S.J.; Podpaly, Y.A.; Reinke, M.L. **Source:** *37th EPS Conference on Plasma Physics 2010, EPS 2010*, v 3, p 1880-1883, 2010, *37th EPS Conference on Plasma Physics 2010, EPS 2010*

Modification of the scrape-off-layer by lower hybrid waves in the Alcator C-Mod tokamak

Wallace, G.M. (MIT Plasma Science and Fusion Center, Cambridge, MA, United States); Parker, R.R.; Bonoli, P.T.; Hubbard, A.E.; Hughes, J.W.; Harvey, R.W.; LaBombard, B.; Meneghini, O.; Schmidt, A.E.; Shiraiwa, S.; Smirnov, A.P.; Whyte, D.G.; Wilson, J.R.; Wright, J.C.; Wukitch, S.J. **Source:** *37th EPS Conference on Plasma Physics 2010, EPS 2010*, v 3, p 1920-1923, 2010, *37th EPS Conference on Plasma Physics 2010, EPS 2010*

Power requirements for high performance H-modes in Alcator C-Mod

Hughes, J.W. (MIT Plasma Science and Fusion Center, Cambridge, MA, United States); Reinke, M.L.; Loarte, A.; Brunner, D.; Hubbard, A.E.; Hutchinson, I.H.; Labombard, B.; Lipschultz, B.; Payne, J.; Terry, J.L.; Wolfe, S.; Wukitch, S.J. **Source:** *37th EPS Conference on Plasma Physics 2010, EPS 2010*, v 2, p 819-822, 2010, *37th EPS Conference on Plasma Physics 2010, EPS 2010*

ICRF mode conversion flow drive in JET D(3He) plasmas and comparison with results from Alcator C-Mod

Lin, Y. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Mantica, P.; Hellsten, T.; Lerche, E.; Nave, M.F.F.; Rice, J.E.; Van Eester, D.; De Vries, P.C.; Felton, R.; Giroud, C.; Kiptily, V.; Tala, T. **Source:** *37th EPS Conference on Plasma Physics 2010, EPS 2010*, v 3, p 1820-1823, 2010, *37th EPS Conference on Plasma Physics 2010, EPS 2010*

An optical timing verification system for Alcator C-Mod

Stillerman, J. (Massachusetts Inst. of Technol., Cambridge, MA, United States); Burke, W.; Labombard, B. **Source:** *Fusion Engineering and Design*, v 85, n 3-4, p 367-9, July 2010

Experimental Study of Reversed Shear Alfven Eigenmodes During the Current Ramp in the Alcator C-Mod Tokamak

Edlund, E. M.; Porkolab, M.; Kramer, G. J.; Lin, L.; Tsuji, N.; Wukitch, S. J. (Princeton Univ., NJ. Plasma Physics Lab.;Massachusetts Inst. of Tech., Cambridge. Plasma Science and Fusion Center.;California Univ., Los Angeles.) **Sponsor:** Department of Energy, Washington, DC. **Report:** PPPL-4544, 22p, Aug 2010

Direct detection of lower hybrid wave using a reflectometer on Alcator C-Mod

Shiraiwa, S. (MIT Plasma Sci. Fusion Center, Cambridge, MA, United States); Baek, S.; Dominguez, A.; Marmar, E.; Parker, R.; Kramer, G.J. **Source:** *Review of Scientific Instruments*, v 81, n 10, p 10D936 (3 pp.), Oct. 2010

Simulated plasma facing component measurements for an in situ surface diagnostic on Alcator C-Mod

Hartwig, Z.S. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Whyte, D.G. **Source:** *Review of Scientific Instruments*, v 81, n 10, p 10E106 (3 pp.), Oct. 2010

Divertor IR thermography on Alcator C-Mod

Terry, J.L. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); LaBombard, B.; Brunner, D.; Payne, J.; Wurden, G.A. **Source:** *Review of Scientific Instruments*, v 81, n 10, p 10E513 (4 pp.), Oct. 2010

Preliminary results from the Alcator C-Mod polarimeter

Xu, P. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Irby, J.H.; Bergerson, W.F.; Bosco, J.; Brower, D.L.; Ding, W.X.; Kanojia, A.; Leccacorvi, R.; Mansfield, D.K.; Marmar, E.S.; Michael, P.; Murray, R.; Rokhman, Y.; Vieira, R. **Source:** *Review of Scientific Instruments*, v 81, n 10, p 10D507 (4 pp.), Oct. 2010

An integrated charge exchange recombination spectroscopy/beam emission spectroscopy diagnostic for Alcator C-Mod tokamak

Bespamyatnov, I.O. (Fusion Res. Center, Univ. of Texas at Austin, Austin, TX, United States); Rowan, W.L.; Liao, K.T.; Granetz, R.S. **Source:** *Review of Scientific Instruments*, v 81, n 10, p 10D709 (4 pp.), Oct. 2010

Scrape-off layer reflectometer for Alcator C-Mod

Lau, C. (MIT PSFC, Cambridge, MA, United States); Hanson, G.; Wilgen, J.; Yijun Lin; Wukitch, S. **Source:** *Review of Scientific Instruments*, v 81, n 10, p 10D918 (3 pp.), Oct. 2010

Vacuum ultraviolet impurity spectroscopy on the Alcator C-Mod tokamak

Reinke, M.L. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Beiersdorfer, P.; Howard, N.T.; Magee, E.W.; Podpaly, Y.; Rice, J.E.; Terry, J.L. **Source:** *Review of Scientific Instruments*, v 81, n 10, p 10D736 (4 pp.), Oct. 2010

Simulated plasma facing component measurements for an in situ surface diagnostic on Alcator C-Mod

Hartwig, Z.S. (Plasma Science and Fusion Center, Massachusetts Institute of Technology, 77 Massachusetts Ave., NW17-155, Cambridge, MA 02139, United States); Whyte, D.G. **Source:** *Review of Scientific Instruments*, v 81, n 10, October 2010

Experimental study of reversed shear Alfve´n eigenmodes during the current ramp in the Alcator C-Mod tokamak

Edlund, E.M. (Princeton Plasma Phys. Lab., Princeton, NJ, United States); Porkolab, M.; Kramer, G.J.; Lin, L.; Lin, Y.; Tsujii, N.; Wukitch, S.J. **Source:** *Plasma Physics and Controlled Fusion*, v 52, n 11, p 115003 (15 pp.), Nov. 2010

Divertor IR thermography on Alcator C-Mod

Terry, J.L. (Plasma Science and Fusion Center, MIT, Cambridge, MA 02139, United States); Labombard, B.; Brunner, D.; Payne, J.; Wurden, G.A. **Source:** *Review of Scientific Instruments*, v 81, n 10, October 2010

I-mode: an H-mode Energy Confinement Regime with L-mode Particle Transport in Alcator C-mod

Whyte, D.G. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Hubbard, A.E.; Hughes, J.W.; Lipschultz, B.; Rice, J.E.; Marmar, E.S.; Greenwald, M.; Cziegler, I.; Dominguez, A.; Golfinopoulos, T.; Howard, N.; Lin, L.; McDermott, R.M.; Porkolab, M.; Reinke, M.L.; Terry, J.; Tsujii, N.; Wolfe, S.; Wukitch, S.; Lin, Y. **Source:**

Nuclear Fusion, v 50, n 10, p 105005 (11 pp.), Oct. 2010

Experimental studies of edge turbulence and confinement in Alcator C-Mod

Cziegler, I. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Terry, J.L.; Hughes, J.W.; LaBombard, B. **Source:** *Physics of Plasmas*, v 17, n 5, p 056120 (8 pp.), May 2010

Rotation and transport in Alcator C-Mod ITB plasmas

Fiore, C.L. (MIT-PSFC, Cambridge, MA, United States); Rice, J.E.; Podpaly, Y.; Bespamyatnov, I.O.; Rowan, W.L.; Hughes, J.W.; Reinke, M. **Source:** *Nuclear Fusion*, v 50, n 6, p 064008 (8 pp.), June 2010

Modification of H-mode pedestal structure with lower hybrid waves on Alcator C-Mod

Hughes, J.W. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Hubbard, A.E.; Wallace, G.; Greenwald, M.; LaBombard, B.; Lin, L.; McDermott, R.M.; Parker, R.R.; Reinke, M.L.; Rice, J.E.; Wilson, J.R. **Source:** *Nuclear Fusion*, v 50, n 6, p 064001 (7 pp.), June 2010

ICRF mode conversion flow drive on Alcator C-Mod

Lin, Y. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Rice, J.E.; Wukitch, S.J.; Greenwald, M.J.; Hubbard, A.E.; Ince-Cushman, A.; Lin, L.; Marmar, E.S.; Porkolab, M.; Reinke, M.L.; Tsujii, N.; Wright, J.C. **Source:** *36th EPS Conference on Plasma Physics 2009, EPS 2009 - Europhysics Conference Abstracts*, v 33 E2, p 1395-1398, 2009, *36th EPS Conference on Plasma Physics 2009, EPS 2009 - Europhysics Conference Abstracts*

Lower Hybrid Heating and Current Drive on the Alcator C-Mod Tokamak

Wilson, J. R.; Parker, R.; Bitter, M.; Bonoli, P. T.; Fiore, C. (Princeton Univ., NJ. Plasma Physics Lab.) **Sponsor:** Department of Energy, Washington, DC. **Report:** PPPL-4472, 16p, Nov 2009

State reconstruction and noise reduction by Kalman filter in the vertical position control on Alcator C-Mod

Ferrara, M. (Massachusetts Inst. of Technol. Plasma Sci. & Fusion Center, Cambridge, MA, United States); Hutchinson, I.H.; Wolfe, S.M. **Source:** *Fusion Science and Technology*, v 56, n 4, p 1476-88, Nov. 2009

Design of a New Optical System for Alcator C-Mod Motional Stark Effect Diagnostic

Ko, J.; Scott, S.; Bitter, M.; Lerner, S. (Princeton Univ., NJ. Plasma Physics Lab.)

Sponsor: Department of Energy, Washington, DC. **Report:** PPPL-4470, 8p, Nov 2009

ICRF mode conversion flow drive on Alcator C-Mod and projections to other tokamaks

Lin, Y. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Rice, J.E.; Wukitch, S.J.; Greenwald, M.J.; Hubbard, A.E.; Ince-Cushman, A.; Lin, L.; Marmar, E.S.; Porkolab, M.; Reinke, M.L.; Tsujii, N.; Wright, J.C. **Source:** *AIP Conference Proceedings*, v 1187, p 57-64, 2009

Integrated numerical design of an innovative lower hybrid launcher for Alcator C-Mod

Meneghini, O. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Shiraiwa, S.; Beck, W.; Irby, J.; Koert, P.; Parker, R.R.; Viera, R.; Wilson, J.; Wukitch, S. **Source:** *AIP Conference Proceedings*, v 1187, p 423-6, 2009

Measurements of mode converted ion cyclotron wave with phase contrast imaging in Alcator C-Mod and comparisons with synthetic PCI simulations in TORIC

Tsujii, N. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Porkolab, M.; Edlund, E.M.; Lin, L.; Lin, Y.; Wright, J.C.; Wukitch, S.J. **Source:** *AIP Conference Proceedings*, v 1187, p 65-8, 2009

Modification of current profile, toroidal rotation and pedestal by lower hybrid waves in Alcator C-Mod

Parker, R. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Bonoli, P.T.; Meneghini, O.; Porkolab, M.; Schmidt, A.E.; Shiraiwa, S.; Wallace, G.; Wilson, J.R.; Hubbard, A.E.; Hughes, J.W.; Ko, J.-S.; McDermott, R.M.; Reinke, M.L.; Rice, J.E.; Scott, S. **Source:** *AIP Conference Proceedings*, v 1187, p 319-26, 2009

Plasma wave simulation based on versatile FEM solver on Alcator C-mod

Shiraiwa, S. (MIT Plasma Sci. Fusion Center, Cambridge, MA, United States); Meneghini, O.; Parker, R.; Wallace, G.; Wilson, J. **Source:** *AIP Conference Proceedings*, v 1187, p 363-6, 2009

Measurement of fast electron transport by lower hybrid modulation experiments in Alcator C-Mod

Schmidt, A.E. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Bonoli, P.T.; Parker, R.; Porkolab, M.; Wallace, G.; Wright, J.C.; Wilson, J.R.; Harvey, R.W.; Smirnov, A.P. **Source:** *AIP Conference Proceedings*, v 1187, p 339-42, 2009

Control of internal profiles via LHCD on Alcator C-Mod

Wilson, J.R. (Princeton Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Parker, R.R.; Bonoli, P.T.; Hubbard, A.E.; Hughes, J.W.; Ince-Cushman, A.; Kessel, C.; Ko, J.S.; Meneghini, O.; Porkolab, M.; Reinke, M.; Rice, J.E.; Schmidt, A.E.; Shiraiwa, S.; Scott, S.; Wallace, G.M.; Wright, J.C. **Source:** *AIP Conference Proceedings*, v 1187, p 327-30, 2009

Engineering considerations in the implementation of high power fast ferrite tuners on Alcator C-MOD

Binus, A.S. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Lin, Y.; Wukitch, S.J.; Pfeiffer, A.; Gwinn, D. **Source:** *Fusion Science and Technology*, v 56, n 2, p 977-82, Aug. 2009

Transmitter protection system upgrade design for lower hybrid current drive system on Alcator C-Mod

Terry, D.R. (Fusion Center, Massachusetts Inst. of Technol. Plasma Sci., Cambridge, MA, United States); Casey, J.A.; MacGibbon, P.A.; Burke, W.M.; Kanojia, A.D.; Lihua Zhou; Stillerman, J.A. **Source:** *Fusion Science and Technology*, v 56, n 1, p 119-24, July 2009

Dimensionless pedestal identity plasmas on Alcator C-Mod and JET

Maddison, G.P. (Culham Sci. Centre, EURATOM/UKAEA Fusion Assoc., Abingdon, United Kingdom); Hubbard, A.E.; Hughes, J.W.; Snipes, J.A.; LaBombard, B.; Nunes, I.M.; Beurskens, M.N.A.; Erents, S.K.; Kempenaars, M.A.H.; Alper, B.; Pinches, S.D.; Valovicˇ, M.; Pasqualotto, R.; Alfier, A.; Giovannozzi, E. **Source:** *Nuclear Fusion*, v 49, n 12, p 125004 (17 pp.), Dec. 2009

Lower hybrid heating and current drive on the Alcator C-Mod tokamak

Wilson, J.R. (Princeton Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Parker, R.; Bitter, M.; Bonoli, P.T.; Fiore, C.; Harvey, R.W.; Hill, K.; Hubbard, A.E.; Hughes, J.W.; Ince-Cushman, A.; Kessel, C.; Ko, J.S.; Meneghini, O.; Phillips, C.K.; Porkolab, M.; Rice, J.; Schmidt, A.E.; Scott, S.; Shiraiwa, S.; Valeo, E.; Wallace, G.; Wright, J.C. **Source:** *Nuclear Fusion*, v 49, n 11, p 115015 (8 pp.), Nov. 2009

Comparison of Scrape-Off Layer Turbulence in Alcator C-Mod with Three Dimensional Gyrofluid Computations

LaBombard, B.; Terry, J. L.; Scott, B. D.; Hughes, J. W.; Stotler, D. P.; Zweben, S. J. (Princeton Univ., NJ. Plasma Physics Lab.) **Sponsor:** Department of Energy, Washington, DC. **Report:** PPPL-4438, 16p, Sep 2009

ICRF specific impurity sources and plasma sheaths in Alcator C-Mod

Wukitch, S.J. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); LaBombard, B.; Lin, Y.; Lipschultz, B.; Marmar, E.; Reinke, M.L.; Whyte, D.G. **Source:** *Journal of Nuclear Materials*, v 390-391, p 951-4, 15 June 2009

Spatial structure of scrape-off-layer filaments near the midplane and X-point regions of Alcator-C-Mod

Terry, J.L. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Zweben, S.J.; Umansky, M.V.; Cziegler, I.; Grulke, O.; LaBombard, B.; Stotler, D.P. **Source:** *Journal of Nuclear Materials*, v 390-391, p 339-42, 15 June 2009

Overview of the Alcator C-Mod research program

Marmar, E. (Massachusetts Inst. of Technol., Cambridge, MA, United States); Bader, A.; Bakhtiari, M.; Barnard, H.; Beck, W.; Bespamyatnov, I.; Binus, A.; Bonoli, P.; Bose, B.; Bitter, M.; Cziegler, I.; Dekow, G.; Dominguez, A.; Duval, B.; Edlund, E.; Ernst, D.; Ferrara, M.; Fiore, C.; Fredian, T.; Graf, A.; Granetz, R.; Greenwald, M.; Grulke, O.; Gwinn, D.; Harrison, S.; Harvey, R.; Hender, T.C.; Hosea, J.; Hill, K.; Howard, N.; Howell, D.F.; Hubbard, A.; Hughes, J.W.; Hutchinson, I.; Ince-Cushman, A.; Irby, J.; Izzo, V.; Kanojia, A.; Kessel, C.; Ko, J.S.; Koert, P.; LaBombard, B.; Lau, C.; Lin, L.; Lin, Y.; Lipschultz, B.; Liptac, J.; Ma, Y.; Marr, K.; May, M.; McDermott, R.; Meneghini, O.; Mikkelsen, D.; Ochoukov, R.; Parker, R.; Phillips, C.K.; Phillips, P.; Podpaly, Y.; Porkolab, M.; Reinke, M.; Rice, J.; Rowan, W.; Scott, S.; Schmidt, A.; Sears, J.; Shiraiwa, S.; Sips, A.; Smick, N.; Snipes, J.; Stillerman, J.; Takase, Y.; Terry, D.; Terry, J.; Tsujii, N.; Valeo, E.; Vieira, R.; Wallace, G.; Whyte, D.; Wilson, J.R.; Wolfe, S.; Wright, G.; Wright, J.; Wukitch, S.; Wurden, G.; Xu, P.; Zhurovich, K.; Zaks, J.; Zweben, S. **Source:** *Nuclear Fusion*, v 49, n 10, p 104014 (10 pp.), Oct. 2009

Comparison of scrape-off layer turbulence in Alcator C-Mod with three dimensional gyrofluid computations

Zweben, S.J. (Princeton Plasma Phys. Lab., Princeton, NJ, United States); Scott, B.D.; Terry, J.L.; LaBombard, B.; Hughes, J.W.; Stotler, D.P. **Source:** *Physics of Plasmas*, v 16, n 8, p 082505 (12 pp.), Aug. 2009

An intermediate power amplifier upgrade for 40 to 80 Mhz for the alcator C-Mod ICRF transmitters

Binus, A. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Wukitch, S.J.; Lin, Y.; Murray, R.; Pfeiffer, A.; Gwinn, D. **Source:** *2009 23rd IEEE/NPSS Symposium on Fusion Engineering - SOFE*, p 4 pp., 2009

New Alcator C-Mod rotated 10° 4-strap ICRF antenna

Koert, P. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Lin, Y.; Mucic, N.P.; Beck, W.K.; Wukitch, S.J.; Doody, J. **Source:** *2009 23rd IEEE/NPSS Symposium on Fusion Engineering - SOFE*, p 3 pp., 2009

Upgrade of the ICRF fault and control systems on alcator C-Mod

Murray, R.A. (Plasma Sci. & Fusion Center Alcator C-Mod, Massachusetts Inst. of Technol., Cambridge, MA, United States); Terry, D.; Lin, Y.; Wukitch, S.; Burke, W.; Parkin, B.; Kanojia, A.; Binus, A. **Source:** *2009 23rd IEEE/NPSS Symposium on Fusion Engineering - SOFE*, p 4 pp., 2009

Phase contrast imaging measurements of reversed shear Alfven eigenmodes during sawteeth in Alcator C-Mod

Edlund, E.M. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Porkolab, M.; Kramer, G.J.; Lin, L.; Lin, Y.; Wukitch, S.J. **Source:** *Physics of Plasmas*, v 16, n 5, p 056106 (8 pp.), May 2009

Edge radial electric field structure and its connections to H-mode confinement in Alcator C-Mod plasmas

McDermott, R.M. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Lipschultz, B.; Hughes, J.W.; Catto, P.J.; Hubbard, A.E.; Hutchinson, I.H.; Granetz, R.S.; Greenwald, M.; LaBombard, B.; Marr, K.; Reinke, M.L.; Rice, J.E.; Whyte, D. **Source:** *Physics of Plasmas*, v 16, n 5, p 056103 (12 pp.), May 2009

Observation of ion cyclotron range of frequencies mode conversion plasma flow drive on Alcator C-Mod

Lin, Y. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Rice, J.E.; Wukitch, S.J.; Greenwald, M.J.; Hubbard, A.E.; Ince-Cushman, A.; Lin, L.; Marmar, E.S.; Porkolab, M.; Reinke, M.L.; Tsujii, N.; Wright, J.C. **Source:** *Physics of Plasmas*, v 16, n 5, p 056102 (9 pp.), May 2009

Spatially Resolving X-Ray Crystal Spectrometer for Measurement of Ion-Temperature and Rotation-Velocity Profiles on the Alcator C-Mod Tokamak

Hill, K. W.; Lee, S. G.; Broennimann, C.; Eikenberry, E. F. (Princeton Univ., NJ. Plasma Physics Lab.) **Sponsor:** Department of Energy, Washington, DC. **Report:** PPPL-4394, 8p, Mar 2009

Studies of turbulence and transport in Alcator C-Mod ohmic plasmas with phase contrast imaging and comparisons with gyrokinetic simulations

Lin, L. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA,

United States); Porkolab, M.; Edlund, E.M.; Rost, J.C.; Greenwald, M.; Tsujii, N.; Candy, J.; Waltz, R.E.; Mikkelsen, D.R. **Source:** *Plasma Physics and Controlled Fusion*, v 51, n 6, p 065006 (19 pp.), June 2009

Observation of reversed shear Alfven eigenmodes between sawtooth crashes in the Alcator C-Mod tokamak

Edlund, E.M. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Porkolab, M.; Kramer, G.J.; Lin, L.; Lin, Y.; Wukitch, S.J. **Source:** *Physical Review Letters*, v 102, n 16, p 165003 (4 pp.), 24 April 2009

Comment on `Magnetic topology effects on Alcator C-Mod scrape-off layer flow'

Aydemir, A.Y. (Inst. for Fusion Studies, Univ. of Texas at Austin, Austin, TX, United States) **Source:** *Plasma Physics and Controlled Fusion*, v 51, n 4, p 048001 (3 pp.), April 2009

Response to comment on 'magnetic topology effects on Alcator C-Mod scrape-off layer flow'

Simakov, A.N. (Theor. Div., Los Alamos Nat. Lab., Los Alamos, NM, United States); Catto, P.J. **Source:** *Plasma Physics and Controlled Fusion*, v 51, n 4, p 048002 (2 pp.), April 2009

Hydrogenic retention with high-Z plasma facing surfaces in Alcator C-Mod

Lipschultz, B. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Whyte, D.G.; Irby, J.; LaBombard, B.; Wright, G.M. **Source:** *Nuclear Fusion*, v 49, n 4, p 045009 (18 pp.), April 2009

Wall scanning probe for high-field side plasma measurements on Alcator C-Mod

Smick, N. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); LaBombard, B. **Source:** *Review of Scientific Instruments*, v 80, n 2, p 023502 (8 pp.), Feb. 2009

Real-time fast ferrite ICRF tuning system on the Alcator C-Mod tokamak

Lin, Y. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Binus, A.; Wukitch, S.J. **Source:** *Fusion Engineering and Design*, v 84, n 1, p 33-7, Jan. 2009

Studies of turbulence and transport in Alcator C-Mod H-mode plasmas with phase contrast imaging and comparisons with GYRO

Lin, L. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Porkolab, M.; Edlund, E.M.; Rost, J.C.; Fiore, C.L.; Greenwald, M.; Lin, Y.; Mikkelsen, D.R.; Tsujii, N.; Wukitch, S.J. **Source:** *Physics of Plasmas*, v 16, n 1, p

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Observations of counter-current toroidal rotation in Alcator C-Mod LHCD plasmas

Rice, J.E. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Ince-Cushman, A.C.; Bonoli, P.T.; Greenwald, M.J.; Hughes, J.W.; Parker, R.R.; Reinke, M.L.; Wallace, G.M.; Fiore, C.L.; Granetz, R.S.; Hubbard, A.E.; Irby, J.H.; Marmar, E.S.; Shiraiwa, S.; Wolfe, S.M.; Wukitch, S.J.; Bitter, M.; Hill, K.; Wilson, J.R. **Source:** *Nuclear Fusion*, v 49, n 2, p 025004 (8 pp.), Feb. 2009

Doppler measurements in the edge of the Alcator C -Mod tokamak using a high-resolution visible spectrometer

Graf, Alexander Turner (University of California, Davis) **Source:** *ProQuest Dissertations and Theses Global*, 2008

Impurity transport studies on Alcator C -Mod tokamak using Charge Exchange Recombination Spectroscopy

Bespamyatnov, Igor Olegovich (The University of Texas at Austin) **Source:** *ProQuest Dissertations and Theses Global*, 2008

Recent ICRF results in alcator C-mod

Wukitch, S.J. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Porkolab, M.; Lin, Y.; Rice, J.E.; Bonoli, P.T.; Wright, J.C. **Source:** *35th EPS Conference on Plasma Physics 2008, EPS 2008 - Europhysics Conference Abstracts*, v 32, n 3, p 2078-2081, 2008, *35th EPS Conference on Plasma Physics 2008, EPS 2008 - Europhysics Conference Abstracts*

Dimensionless pedestal identity plasmas on alcator C-mod and JET

Maddison, G.P. (EURATOM/UKAEA Fusion Association, Culham Science Centre, Abingdon, OX14 3DB, United Kingdom); Hubbard, A.E.; Hughes, J.W.; Snipes, J.A.; LaBombard, B.; Nunes, I.M.; Beurskens, M.N.A.; Erents, S.K.; Kempenaars, M.A.H.; Alper, B.; Pinches, S.D.; Valovicˇ, M.; Pasqualotto, R.; Alfier, A.; Giovannozzi, E. **Source:** *35th EPS Conference on Plasma Physics 2008, EPS 2008 - Europhysics Conference Abstracts*, v 32, n 1, p 109-112, 2008, *35th EPS Conference on Plasma Physics 2008, EPS 2008 - Europhysics Conference Abstracts*

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Hughes, J.W. (MIT Plasma Science and Fusion Center, Cambridge, MA, United States); Hubbard, A.E.; LaBombard, B.; Lipschultz, B.; McDermott, R.; Wolfe, S. **Source:** *35th EPS Conference on Plasma Physics 2008, EPS 2008 - Europhysics Conference Abstracts*, v 32, n 1, p 205-208, 2008, *35th EPS Conference on Plasma Physics 2008,*

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Plasma current and toroidal field dependence of the H-mode threshold low density limit on Alcator C-Mod

Snipes, J.A. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Greenwald, M.; Hubbard, A.; Hughes, J.W.; LaBombard, B.; Rice, J.E. **Source:** *35th EPS Conference on Plasma Physics 2008, EPS 2008 - Europhysics Conference Abstracts*, v 32, n 1, p 441-444, 2008, *35th EPS Conference on Plasma Physics 2008, EPS 2008 - Europhysics Conference Abstracts*

Engineering Village

Reversed shear Alfvén eigenmodes in alcator C-mod during ICRF minority heating and relationship to sawtooth crash phenomena

Edlund, E.M. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Porkolab, M.; Kramer, G.J.; Lin, L.; Lin, Y.; Tsujii, N.; Wukitch, S.J. **Source:** *35th EPS Conference on Plasma Physics 2008, EPS 2008 - Europhysics Conference Abstracts*, v 32, n 3, p 2118-2121, 2008, *35th EPS Conference on Plasma Physics 2008, EPS 2008 - Europhysics Conference Abstracts*

Current profile control using LHCD in Alcator C-Mod

Parker, R.R. (Plasma Science and Fusion Center, MIT, Cambridge, MA, United States); Wilson, J.R.; Bonoli, P.T.; Harvey, R.W.; Hubbard, A.E.; Ince-Cushman, A.; Ko, J.-S.; Meneghini, O.; Porkolab, M.; Rice, J.E.; Schmidt, A.E.; Scott, S.D.; Shiraiwa, S.; Wallace, G.M.; Wright, J.C. **Source:** *35th EPS Conference on Plasma Physics 2008, EPS 2008 - Europhysics Conference Abstracts*, v 32, n 3, p 1670-1673, 2008, *35th EPS Conference on Plasma Physics 2008, EPS 2008 - Europhysics Conference Abstracts*

Ion-temperature and rotation-velocity profile measurements from a spatially resolving x-ray crystal spectrometer on the alcator C-Mod tokamak

Hill, K.W. (PPPL, Princeton University, Princeton, NJ 08543, United States); Bitter, M.L.; Scott, S.D.; Ince-Cushman, A.; Reinke, M.; Rice, J.E.; Beiersdorfer, P.; Gu, M.-F.; Lee, S.G.; Broennimann, Ch.; Eikenberry, E.F. **Source:** *35th EPS Conference on Plasma Physics 2008, EPS 2008 - Europhysics Conference Abstracts*, v 32, n 1, p 473-476, 2008, *35th EPS Conference on Plasma Physics 2008, EPS 2008 - Europhysics Conference Abstracts*

Spontaneous core toroidal rotation in Alcator C-Mod L-mode, H-mode and ITB plasmas

Rice, J.E. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Ince-Cushman, A.C.; Reinke, M.L.; Podpaly, Y.; Greenwald, M.J.; LaBombard, B.; Marmar, E.S. **Source:** *Plasma Physics and Controlled Fusion*, v 50, n 12, p 124042 (11 pp.), Dec. 2008

Toroidally resolved radiation dynamics during a gas jet mitigated disruption on Alcator C-Mod

Reinke, M.L. (Plasma Sci. & Fusion Center, Cambridge, MA, United States); Whyte, D.G.; Granetz, R.; Hutchinson, I.H. **Source:** *Nuclear Fusion*, v 48, n 12, p 125004 (7 pp.), Dec. 2008

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Hill, K.W. (Princeton Univ., Princeton, NJ, United States); Bitter, M.L.; Scott, S.D.; Ince-Cushman, A.; Reinke, M.; Rice, J.E.; Beiersdorfer, P.; Gu, M.-F.; Lee, S.G.; Broennimann, C.; Eikenberry, E.F. **Source:** *Review of Scientific Instruments*, v 79, n 10, p 10E320 (4 pp.), Oct. 2008

Multichannel Doppler transmission grating spectrometer at the Alcator C-Mod tokamak

Graf, A. (Univ. of California at Davis, Davis, CA, United States); May, M.; Beiersdorfer, P. **Source:** *Review of Scientific Instruments*, v 79, n 10, p 10F544 (3 pp.), Oct. 2008

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Rowan, W.L. (Fusion Res. Center, Univ. of Texas at Austin, Austin, TX, United States); Bespamyatnov, I.O.; Granetz, R.S. **Source:** *Review of Scientific Instruments*, v 79, n 10, p 10F529 (4 pp.), Oct. 2008

Design of a new optical system for alcator C-mod motional stark effect diagnostic

Jinseok Ko (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Scott, S.; Bitter, M.; Lerner, S. **Source:** *Review of Scientific Instruments*, v 79, n 10, p 10F520 (4 pp.), Oct. 2008

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Reinke, M.L. (Massachusetts Inst. of Technol., Cambridge, MA, United States); Hutchinson, I.H. **Source:** *Review of Scientific Instruments*, v 79, n 10, p 10F306 (4 pp.), Oct. 2008

Scrape-off layer reflectometer for Alcator C-Mod

Hanson, G.R. (Oak Ridge Nat. Lab., Oak Ridge, TN, United States); Wilgen, J.B.; Lau, C.; Lin, Y.; Wallace, G.M.; Wukitch, S.J. **Source:** *Review of Scientific Instruments*, v 79,

n 10, p 10F114 (4 pp.), Oct. 2008

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Graf, A. (University of California at Davis, CA 95616, United States); May, M.; Beiersdorfer, P. **Source:** *Review of Scientific Instruments*, v 79, n 10, 2008

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Ko, Jinseok (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Scott, Steve; Bitter, Manfred; Lerner, Scott **Source:** *Review of Scientific Instruments*, v 79, n 10, 2008

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Hanson, G.R. (Oak Ridge National Laboratory, Oak Ridge, TN 37831, United States); Wilgen, J.B.; Lau, C.; Lin, Y.; Wallace, G.M.; Wukitch, S.J. **Source:** *Review of Scientific Instruments*, v 79, n 10, 2008

Magnetic topology effects on Alcator C-Mod scrape-off layer flow

Simakov, A.N. (Los Alamos Nat. Lab., Los Alamos, NM, United States); Catto, P.J.; LaBombard, B.; Glasser, A.H. **Source:** *Plasma Physics and Controlled Fusion*, v 50, n 10, p 105010 (10 pp.), Oct. 2008

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Rowan, W.L. (Fusion Res. Center, Univ. of Texas at Austin, Austin, TX, United States); Bespamyatnov, I.O.; Fiore, C.L. **Source:** *Nuclear Fusion*, v 48, n 10, p 105005 (7 pp.), Oct. 2008

Ion-temperature and rotation-velocity profile measurements from a spatially resolving X-ray crystal spectrometer on the alcator C-Mod tokamak

Hill, K.W. (Princeton Univ., Princeton, NJ, United States); Bitter, M.; Scott, S.D.; Ince-Cushman, A.; Rice, J.E.; Reinke, M.; Beiersdorfer, P.; Ming-Feng Gu; Lee, S.G.; Broennimann, C.; Eikenberry, E.F. **Source:** *2008 IEEE 35th International Conference on Plasma Science*, p 1 pp., 2008

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Snipes, J.A. (MIT Plasma Sci. & Fusion Center, Cambridge, MA, United States); Parker, R.R.; Phillips, P.E.; Schmidt, A.; Wallace, G. **Source:** *Nuclear Fusion*, v 48, n 7, p 072001 (6 pp.), 1 July 2008

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Izzo, V.A. (Univ. of California-San Diego, La Jolla, CA, United States); Whyte, D.G.; Granetz, R.S.; Parks, P.B.; Hollmann, E.M.; Lao, L.L.; Wesley, J.C. **Source:** *Physics of Plasmas*, v 15, n 5, p 056109-1-1, May 2008

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LaBombard, B. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Hughes, J.W.; Smick, N.; Graf, A.; Marr, K.; McDermott, R.; Reinke, M.; Greenwald, M.; Lipschultz, B.; Terry, J.L.; Whyte, D.G.; Zweben, S.J.; Alcator C-Mod Team **Source:** *Physics of Plasmas*, v 15, n 5, p 056106-1-12, May 2008

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Bonoli, P.T. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Ko, J.; Parker, R.; Schmidt, A.E.; Wallace, G.; Wright, J.C.; Fiore, C.L.; Hubbard, A.E.; Irby, J.; Marmar, E.; Porkolab, M.; Terry, D.; Wolfe, S.M.; Wukitch, S.J.; Wilson, J.R.; Scott, S.; Valeo, E.; Phillips, C.K.; Harvey, R.W. **Source:** *Physics of Plasmas*, v 15, n 5, p 056117-1-1, May 2008

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Ferraraa, I.M. (M.I.T. Plasma Sci. & Fusion Center, Cambridge, MA, United States); Hutchinson, I.H.; Wolfe, S.M. **Source:** *Nuclear Fusion*, v 48, n 6, p 065002 (7 pp.), June 2008

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Lin, Y. (MIT, Plasma Sci. & Fusion Center, Cambridge, MA, United States); Stillerman, J.A.; Binus, A.; Parisot, A.; Wukitch, S. **Source:** *Fusion Engineering and Design*, v 83, n 2-3, p 241-4, April 2008

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Parisot, A. (Plasma Science and Fusion Center, MIT, Cambridge, MA, United States); Wukitch, S.J.; Bonoli, P.; Greenwald, M.; Hubbard, A.; Lin, Y.; Parker, R.; Porkolab, M.; Ram, A.K.; Wright, J.C. **Source:** *34th EPS Conference on Plasma Physics 2007, EPS 2007 - Europhysics Conference Abstracts*, v 31, n 3, p 1665-1668, 2007, *34th EPS Conference on Plasma Physics 2007, EPS 2007 - Europhysics Conference Abstracts*

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Hubbard, A.E. (MIT Plasma Science and Fusion Center, Cambridge, MA, United States); Hughes, J.W.; Greenwald, M.; LaBombard, B.; Lin, Y.; Terry, J.L.; Wukitch, S. **Source:** *34th EPS Conference on Plasma Physics 2007, EPS 2007 - Europhysics Conference Abstracts*, v 31, n 1, p 168-171, 2007, *34th EPS Conference on Plasma Physics 2007, EPS 2007 - Europhysics Conference Abstracts*

Lower hybrid current drive experiments in alcator C-mod

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Overview of the Alcator C-MOD research programme

Scott, S. (Princeton Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Bader, A.; Bakhtiari, M.; Basse, N.; Beck, W.; Biewer, T.; Bernabei, S.; Bonoli, P.; Bose, B.; Bravenec, R.; Bespamyatnov, I.; Childs, R.; Cziegler, I.; Doerner, R.; Edlund, E.; Ernst, D.; Fasoli, A.; Ferrara, M.; Fiore, C.; Fredian, T.; Graf, A.; Graves, T.; Granetz, R.; Greenough, N.; Greenwald, M.; Grimes, M.; Grulke, O.; Gwinn, D.; Harvey, R.; Harrison, S.; Hender, T.C.; Hosea, J.; Howell, D.F.; Hubbard, A.E.; Hughes, J.W.; Hutchinson, I.; Ince-Cushman, A.; Irby, J.; Jernigan, T.; Johnson, D.; Ko, J.; Koert, P.; LaBombard, B.; Kanojia, A.; Lin, L.; Lin, Y.; Lipschultz, B.; Liptac, J.; Lynn, A.; MacGibbon, P.; Marmar, E.; Marr, K.; May, M.; Mikkelsen, D.R.; McDermott, R.; Parisot, A.; Parker, R.; Phillips, C.K.; Phillips, P.; Porkolab, M.; Reinke, M.; Rice, J.; Rowan, W.; Sampsell, M.; Schilling, G.; Schmidt, A.; Smick, N.; Smirnov, A.; Snipes, J.; Stotler, D.; Stillerman, J.; Tang, V.; Terry, D.; Terry, J.; Ulrickson, M.; Vieira, R.; Wallace, G.; Whyte, D.; Wilson, J.R.; Wright, G.; Wright, J.; Wolfe, S.; Wukitch, S.; Wurden, G.; Yuh, H.; Zhurovich, K.; Zaks, J.; Zweben, S. **Source:** *Nuclear Fusion*, v 47, n 10, p S598-S607, Oct. 2007

The coupler protection system upgrade for lower hybrid current drive on alcator C-Mod

Burke, W. (Plasma Science and Fusion Center, Massachusetts Institute of Technology, Cambridge, MA, United States); Terry, D.R.; Kennedy, H.; Stillerman, J.; McLean, J.; Milne, P. **Source:** *Proceedings - Symposium on Fusion Engineering*, 2007, *Proceedings of the 22nd IEEE/NPSS Symposium on Fusion Engineering - SOFE 07*

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Terry, D.R. (Massachusetts Institute of Technology, Plasma Science and Fusion Center, Cambridge, MA, United States); Burke, W.; Kanojia, A.; MacGibbon, P.; Johnson, D.; Parker, R.R.; Vieira, R.F.; Wallace, G.; Beck, W.; Koert, P.; Irby, J.;

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Microturbulent drift mode suppression as a trigger mechanism for internal transport barriers on Alcator C-Mod

Zhurovich, K. (Princeton Plasma Phys. Lab., Princeton, NJ, United States); Fiore, C.L.; Ernst, D.R.; Bonoli, P.T.; Greenwald, M.; Hubbard, A.E.; Hughes, J.W.; Marmar, E.S.; Mikkelsen, D.R.; Phillips, P.; Rice, J.E. **Source:** *Nuclear Fusion*, v 47, n 9, p 1220-31, Sept. 2007

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Greenwald, M. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Angioni, C.; Hughes, J.W.; Terry, J.; Weisen, H. **Source:** *Nuclear Fusion*, v 47, n 9, p L26, Sept. 2007

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Hughes, J.W. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); LaBombard, B.; Terry, J.; Hubbard, A.; Lipschultz, B. **Source:** *Nuclear Fusion*, v 47, n 8, p 1057-63, Aug. 2007

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Granetz, R.S. (Fusion Center, MIT Plasma Sci., Cambridge, MA, United States); Hollmann, E.M.; Whyte, D.G.; Izzo, V.A.; Antar, G.Y.; Bader, A.; Bakhtiari, M.; Biewer, T.; Boedo, J.A.; Evans, T.E.; Hutchinson, I.H.; Jernigan, T.C.; Gray, D.S.; Groth, M.; Humphreys, D.A.; Lasnier, C.J.; Moyer, R.A.; Parks, P.B.; Reinke, M.L.; Rudakov, D.L.; Strait, E.J.; Terry, J.L.; Wesley, J.; West, W.P.; Wurden, G.; Yu, J. **Source:** *Nuclear Fusion*, v 47, n 9, p 1086-91, Sept. 2007

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Greenwald, M. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Basse, N.; Bonoli, P.; Bravenec, R.; Edlund, E.; Ernst, D.; Fiore, C.; Granetz, R.; Hubbard, A.; Hughes, J.; Hutchinson, I.; Irby, J.; Labombard, B.; Lin, L.; Lin, Y.; Lipschultz, B.; Marmar, E.; Mikkelsen, D.; Mossessian, D.; Phillips, P.; Porkolab, M.; Rice, J.; Rowan, W.; Scott, S.; Snipes, J.; Terry, J.; Wolfe, S.; Wukitch, S.; Zhurovich, K. **Source:** *Fusion Science and Technology*, v 51, n 3, p 266-87, April 2007

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Lipschultz, B. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); LaBombard, B.; Lisgo, S.; Terry, J.L. **Source:** *Fusion Science and Technology*, v 51, n 3, p 390-400, April 2007

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The Alcator C-Mod program

Marmar, E.S. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States) **Source:** *Fusion Science and Technology*, v 51, n 3, p 261-5, April 2007

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Bonoli, P.T. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Parker, R.; Wukitch, S.J.; Lin, Y.; Porkolab, M.; Wright, J.C.; Edlund, E.; Graves, T.; Lin, L.; Liptac, J.; Parisot, A.; Schmidt, A.E.; Tang, V.; Beck, W.; Childs, R.; Grimes, M.; Gwinn, D.; Johnson, D.; Irby, J.; Kanojia, A.; Koert, P.; Marazita, S.; Marmar, E.; Terry, D.; Vieira, R.; Wallace, G.; Zaks, J.; Bernabei, S.; Brunkhorse, C.; Ellis, R.; Fredd, E.; Greenough, N.; Hosea, J.; Kung, C.C.; Loesser, G.D.; Rushinski, J.; Schilling, G.; Phillips, C.K.; Wilson, J.R.; Harvey, R.W.; Fiore, C.L.; Granetz, R.; Greenwald, M.; Hubbard, A.E.; Hutchinson, I.H.; LaBombard, B.; Lipschultz, B.; Rice, J.; Snipes, J.A.; Terry, J.; Wolfe, S.M. **Source:** *Fusion Science and Technology*, v 51, n 3, p 401-36, April 2007

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Bitter, M.L. (Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Broennimann, C.; Eikenberry, E.F.; Hill, K.W.; Ince-Cushman, A.; Lee, S.G.; Rice, J.E.; Scott, S. **Source:** *2006 IEEE Nuclear Science Symposium Conference Record (IEEE Cat. No.06CH37832)*, p 3 pp., 2007

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Whyte, D.G. (Univ. of Wisconsin Madison, Madison, WI, United States); Granetz, R.;

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Catto, Peter J. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Simakov, Andrei N. **Source:** *Physics of Plasmas*, v 14, n 2, 2007

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Real time control of the active MHD diagnostic on Alcator C Mod

Burke, W. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Cochran, W.; Sears, J.; Snipes, J.; Wolfe, S.; Zhong, X. **Source:** *21st IEEE/NPSS Symposium on Fusion Engineering. SOFE 05 (IEEE Cat. No.05CH37764)*, p 5 pp., 2007

Installation and operation of new long pulse DNB on Alcator C-Mod

Beals, D.F. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Granetz, R.; Cochran, W.; Byford, W.; Rowan, W.L.; Ivanov, A.A.; Deichuli, P.P.; Kolmogorov, V.V.; Shulzhenko, G. **Source:** *21st IEEE/NPSS Symposium on Fusion Engineering. SOFE 05 (IEEE Cat. No.05CH37764)*, p 4 pp., 2007

New microstrip directional coupler design for side of waveguide in lower hybrid current drive system on Alcator C-Mod

Koert, P. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Wallace,

G.; Parker, R.; Terr, D.R.; Wukitch, S.J. **Source:** *21st IEEE/NPSS Symposium on Fusion Engineering. SOFE 05 (IEEE Cat. No.05CH37764)*, p 3 pp., 2007

H-mode pedestal and threshold studies over an expanded operating space on Alcator C-Mod

Hubbard, A.E. (Plasma Science and Fusion Center, Massachusetts Institute of Technology, Cambridge, MA 02129, United States); Hughes, J.W.; Bespamyatnov, I.O.; Biewer, T.; Cziegler, I.; Labombard, B.; Lin, Y.; McDermott, R.; Rice, J.E.; Rowan, W.L.; Snipes, J.A.; Terry, J.L.; Wolfe, S.M.; Wukitch, S. **Source:** *Physics of Plasmas*, v 14, n 5, 2007

Experimental and numerical characterization of ion-cyclotron heated protons on the Alcator C-Mod tokamak

Tang, V. (Massachusetts Institute of Technology, Plasma Science and Fusion Center, Cambridge, MA, United States); Parker, R.R.; Bonoli, P.T.; Wright, J.C.; Granetz, R.S.; Harvey, R.W.; Jaeger, E.F.; Liptac, J.; Fiore, C.L.; Greenwald, M.; Irby, J.H.; Lin, Y.; Wukitch, S.J. **Source:** *Plasma Physics and Controlled Fusion*, v 49, n 6, p 873-904, June 1, 2007

Recent ICRF results in Alcator C-Mod

Wukitch, S.J. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Porkolab, M.; Graves, T.; Hutchinson, I.H.; Lin, Y.; Lipschultz, B.; Marmar, E.; Parisot, A.; Reinke, M.; Rice, J.; Terry, J. **Source:** *33rd EPS Conference on Plasma Physics 2006, EPS 2006*, v 3, p 2176-2179, 2006, *33rd EPS Conference on Plasma Physics 2006, EPS 2006 - Europhysics Conference Abstracts*

Moderate toroidal mode number Alfvén Eigenmode damping rate measurements on Alcator C-Mod

Snipes, J.A. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Fasoli, A.; Gorelenkov, N.N.; Parker, R.R.; Sears, J.A.; Tang, V. **Source:** *33rd EPS Conference on Plasma Physics 2006, EPS 2006*, v 3, p 2172-2175, 2006, *33rd EPS Conference on Plasma Physics 2006, EPS 2006 - Europhysics Conference Abstracts*

H-mode pedestal and core plasma response to gas fueling on the Alcator C-Mod tokamak

Hughes, J.W. (MIT Plasma Science and Fusion Center, Cambridge, MA, United States); LaBombard, B.; Terry, J. **Source:** *33rd EPS Conference on Plasma Physics 2006, EPS 2006*, v 3, p 2180-2183, 2006, *33rd EPS Conference on Plasma Physics 2006, EPS 2006 - Europhysics Conference Abstracts*

Operation of Alcator C-Mod with high-Z plasma facing components with and without boronization

Marmar, E. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United States); Lin, Y.; Lipschultz, B.; Whyte, D.; Bonoli, P.; Fiore, C.; Greenwald, M.; Hutchinson, I.; Irby, J.; Reinke, M.; Rice, J.; Scott, S.; Terry, J.; Wolfe, S.; Wukitch, S. **Source:** *33rd EPS Conference on Plasma Physics 2006, EPS 2006*, v 1, p 17-20, 2006, *33rd EPS Conference on Plasma Physics 2006, EPS 2006 - Europhysics Conference Abstracts*

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Ferrara, Marco (Plasma Science and Fusion Center, Massachusetts Institute of Technology, Cambridge, MA); Hutchinson, Ian H.; Wolfe, Stephen M.; Stillerman, Joshua A.; Fredian, Thomas M. **Source:** *Proceedings of the IEEE Conference on Decision and Control*, p 2238-2243, 2006, *Proceedings of the 45th IEEE Conference on Decision and Control 2006, CDC*

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Hubbard, A.E. (Fusion Center, MIT Plasma Sci., Fusion Center, MA, United States); Kamiya, K.; Oyama, N.; Basse, N.; Biewer, T.; Edlund, E.; Hughes, J.W.; Lin, L.; Porkolab, M.; Rowan, W.; Snipes, J.; Terry, J.; Wolfe, S.M. **Source:** *Plasma Physics and Controlled Fusion*, v 48, n 5A, p A121-9, May 2006

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Liptac, J. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Parker, R.; Tang, V.; Peysson, Y.; Decker, J. **Source:** *Review of Scientific Instruments*, v 77, n 10, p 103504-1-7, Oct. 2006

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Ince-Cushman, A. (Massachusetts Inst. of Technol., Cambridge, MA, United States); Rice, J.E.; Lee, S.G.; Bitter, M.; Reinke, M.; Podpaly, Y. **Source:** *Review of Scientific Instruments*, v 77, n 10, p 10F321-1-4, Oct. 2006

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Graf, A. (Univ. of California, Davis, Davis, CA, United States); Howard, S.; Horton, R.; Hwang, D.; May, M.; Beiersdorfer, P.; Terry, J. **Source:** *Review of Scientific Instruments*, v 77, n 10, p 10F125-1-3, Oct. 2006

Vertical localization of phase contrast imaging diagnostic in alcator C-mod

Lin, L. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Edlund, E.M.; Porkolab, M.; Lin, Y.; Wukitch, S.J. **Source:** *Review of*

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Snipes, J.A. (Fusion Centre, MIT Plasma Sci., Cambridge, MA, United States); Gorelenkov, N.N.; Sears, J.A. **Source:** *Nuclear Fusion*, v 46, n 12, p 1036-46, Dec. 2006

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Granetz, R. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Whyte, D.G.; Izzo, V.A.; Biewer, T.; Reinke, M.L.; Terry, J.; Bader, A.; Bakhtiari, M.; Jernigan, T.; Wurden, G. **Source:** *Nuclear Fusion*, v 46, n 12, p 1001-8, Dec. 2006

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Burke, W. (MIT Plasma Science and Fusion Center, 190 Albany Street, Cambridge, MA 02139); Cochran, W.; Sears, J.; Snipes, J.; Wolfe, S.; Zhong, X. **Source:** *Proceedings - Symposium on Fusion Engineering*, 2006, *21st IEEE/NPS Symposium on Fusion Engineering, SOFE'05*

Alcator C-Mod status, recent accomplishments, and future plans

Granetz, R.S. (MIT Plasma Science and Fusion Center); Irby, J.; Labombard, B.; Lin, Y.; Lipschultz, B.; Zaks, J. **Source:** *Proceedings - Symposium on Fusion Engineering*, 2006, *21st IEEE/NPS Symposium on Fusion Engineering, SOFE'05*

New microstrip directional coupler design for side of waveguide in lower hybrid current drive system on alcator C-mod

Koert, P. (MIT Plasma Science and Fusion Center, 190 Albany Street, Cambridge, MA 02139); Wallace, G.; Parker, R.; Terry, D.R.; Wukitch, S.J. **Source:** *Proceedings - Symposium on Fusion Engineering*, 2006, *21st IEEE/NPS Symposium on Fusion Engineering, SOFE'05*

Commissioning of the lower hybrid current drive system on Alcator C-mod

Terry, D.R. (MIT Plasma Science and Fusion Center, Cambridge, MA, United States); Parker, R.; Liptac, J.; Kanojia, A.; Johnson, D.; Koert, P.; Wallace, G.; Beals, D.; Vieira,

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Installation and operation of new long pulse DNB on Alcator C-Mod

Beals, D.F. (MIT Plasma Science and Fusion Center, 190 Albany Street, Cambridge, MA 02139); Granetz, R.; Cochran, W.; Byford, W.; Rowan, W.L.; Ivanov, A.A.; Deichuli, P.P.; Kolmogorov, V.V.; Shulzhenko, G. **Source:** *Proceedings - Symposium on Fusion Engineering*, 2006, *21st IEEE/NPS Symposium on Fusion Engineering, SOFE'05*

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Fredian, T.W. (MIT, Cambridge, MA, United States); Stillerman, J.A. **Source:** *Fusion Engineering and Design*, v 81, n 15-17, p 1963-7, July 2006

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Stillerman, J.A. (Massachusetts Inst. of Technol., Albany St. Cambridge, MA, United States); Ferrara, M.; Fredian, T.W.; Wolfe, S.M. **Source:** *Fusion Engineering and Design*, v 81, n 15-17, p 1905-10, July 2006

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Structure and motion of edge turbulence in the national spherical torus experiment and alcator C-mod

Zweben, S.J. (Princeton Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Maqueda, R.J.; Terry, J.L.; Munsat, T.; Myra, J.R.; D'Ippolito, D.; Russell, D.A.; Krommes, J.A.; LeBlanc, B.; Stoltzfus-Dueck, T.; Stotler, D.P.; Williams, K.M.; Bush, C.E.; Maingi, R.; Grulke, O.; Sabbagh, S.A.; White, A.E. **Source:** *Physics of Plasmas*, v 13, n 5, p 56114-1-8, May 2006

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Hughes, J.W. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); LaBombard, B.; Mossessian, D.A.; Hubbard, A.E.;

Terry, J.; Biewer, T. **Source:** *Physics of Plasmas*, v 13, n 5, p 56103-1-11, May 2006

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Lipschultz, B. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Lin, Y.; Reinke, M.L.; Hubbard, A.; Hutchinson, I.H.; Irby, J.; LaBombard, B.; Marmar, E.S.; Marr, K.; Terry, J.L.; Wolfe, S.M.; Whyte, D. **Source:** *Physics of Plasmas*, v 13, n 5, p 56117-1-12, May 2006

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Catto, P.J. (Fusion Center, MIT Plasma Sci., Cambridge, MA, United States); Simakov, A.N. **Source:** *Physics of Plasmas*, v 13, n 5, p 52507-1-8, May 2006

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Graves, T.P. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Wukitch, S.J.; LaBombard, B.; Hutchinson, I.H. **Source:** *Journal of Vacuum Science & Technology A (Vacuum, Surfaces, and Films)*, v 24, n 3, p 512-16, May 2006

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Grulke, O. (Ernst-Moritz-Arndt Univ., Greifswald, Germany); Terry, J.L.; LaBombard, B.; Zweben, S.J. **Source:** *Physics of Plasmas*, v 13, n 1, p 12306-1-7, Jan. 2006

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Terry, J.L. (Plasma Science and Fusion Center, MIT, Cambridge; MA; 02139-4307, United States); Basse, N.P.; Cziegler, I.; Greenwald, M.; Grulke, O.; Labombard, B.; Zweben, S.J.; Edlund, E.M.; Hughes, J.W.; Lin, L.; Lin, Y.; Porkolab, M.; Sampsell, M.; Veto, B.; Wukitch, S.J. **Source:** *Nuclear Fusion*, v 45, n 11, p 1321-1327, October 24, 2005

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Porkolab, M. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Edlund, E.; Snipes, J.; Wukitch, S.; Basse, N.; Bonoli, P.; Boswell, C.; Fiore, C.; Gorelenkov, N.; Hubbard, A.; Kramer, G.J.; Lin, L.; Lin, Y.; Marmar, E.; Schilling, G. **Source:** *AIP Conference Proceedings*, n 787, p 114-17, 2005

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Zweben, S.J. (Princeton Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Terry, J.L.; Bonoli, P.; Budny, R.; Chang, C.S.; Fiore, C.; Hughes, J.; Lin, Y.; Perkins, R.; Porkolab, M.; Schilling, G.; Wukitch, S. **Source:** *AIP Conference Proceedings*, n 787, p 118-21, 2005

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LaBombard, B. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Hughes, J.W.; Mossessian, D.; Greenwald, M.; Lipschultz, B.; Terry, J.L. **Source:** *Nuclear Fusion*, v 45, n 12, p 1658-75, Dec. 2005

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Parker, R. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Basse, N.; Beck, W.; Bernabei, S.; Childs, R.; Ellis, R.; Fredd, E.; Greenough, N.; Grimes, M.; Gwinn, D.; Hosea, J.; Irby, J.; Koert, P.; Kung, C.C.; Lambobard, B.; Liptac, J.; Loesser, G.D.; Marmar, E.; Schilling, G.; Terry, D.; Terry, J.; Vieira, R.; Wallace, G.; Wilson, J.R.; Zaks, J. **Source:** *AIP Conference Proceedings*, n 787, p 327-30, 2005

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Schilling, G. (Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Wukitch, S.J.; Lin, Y.; Parisot, A.; Porkolab, M. **Source:** *AIP Conference Proceedings*, n 787, p 206-9, 2005

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Hosea, J. (Princeton Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Beals, D.; Beck, W.; Bernabei, S.; Burke, W.; Childs, R.; Ellis, R.; Fredd, E.; Greenough, N.; Grimes, M.; Gwinn, D.; Irby, J.; Jurczynski, S.; Koert, P.; Kung, C.C.; Loesser, G.D.; Marmar, E.; Parker, R.; Rushinski, J.; Schilling, G.; Terry, D.; Vieira, R.; Wilson, J.R.;

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Stober, J. (MPI fur Plasmaphys., EURATOM Assoc., Garching, Germany); Lomas, P.J.; Saibene, G.; Andrew, Y.; Belo, P.; Conway, G.D.; Herrmann, A.; Horton, L.D.; Kempenaars, M.; Koslowski, H.-R.; Loarte, A.; Maddison, G.P.; Maraschek, M.; McDonald, D.C.; Meigs, A.G.; Monier-Garbet, P.; Mossessian, D.A.; Nave, M.F.F.; Oyama, N.; Parail, V.; Perez, Ch.P.; Rimini, F.; Sartori, R.; Sips, A.C.C.; Thomas, P.R. **Source:** *Nuclear Fusion*, v 45, n 11, p 1213-23, Nov. 2005

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Lipschultz, B. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Whyte, D.; LaBombard, B. **Source:** *Plasma Physics and Controlled Fusion*, v 47, n 10, p 1559-78, Oct. 2005

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Redi, M.H. (Princeton Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Dorland, W.; Fiore, C.L.; Baumgaertel, J.A.; Belli, E.M.; Hahm, T.S.; Hammett, G.W.; Rewoldt, G. **Source:** *Physics of Plasmas*, v 12, n 7, p 72519-1-10, July 2005

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Smick, N. (Fusion Center, MIT Plasma Sci., Cambridge, MA, United States); LaBombard, B.; Pitcher, C.S. **Source:** *Journal of Nuclear Materials*, v 337-339, p 281-5, 1 March 2005

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Lisgo, S. (Inst. for Aerosp. Studies, Univ. of Toronto, Toronto, Ont., Canada); BArner, P.; Boswell, C.; Elder, D.; LaBombard, B.; Lipschultz, B.; Pitcher, C.S.; Reiter, D.; Stangeby, P.C.; Terry, J.L.; Wiesen, S. **Source:** *Journal of Nuclear Materials*, v 337-339, p 139-45, 1 March 2005

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Chung, T. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Hutchinson, I.H.; Lipschultz, B.; LaBombard, B.; Lisgo, S. **Source:** *Journal of Nuclear Materials*, v 337-339, p 109-13, 1 March 2005

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Stotler, D.P. (Princeton Plasma Phys. Lab., Princeton Univ., North Princeton, NJ, United States); LaBombard, B. **Source:** *Journal of Nuclear Materials*, v 337-339, p 510-14, 1 March 2005

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LaBombard, B. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Rice, J.E.; Hubbard, A.E.; Hughes, J.W.; Greenwald, M.; Granetz, R.S.; Irby, J.H.; Lin, Y.; Lipschultz, B.; Marmar, E.S.; Marr, K.; Mossessian, D.; Parker, R.; Rowan, W.; Smick, N.; Snipes, J.A.; Terry, J.L.; Wolfe, S.M.; Wukitch, S.J. **Source:** *Physics of Plasmas*, v 12, n 5, p 56111-1-10, May 2005

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Wukitch, S.J. (Fusion Center, MIT Plasma Sci., Cambridge, MA, United States); Lin, Y.; Parisot, A.; Wright, J.C.; Bonoli, P.T.; Porkolab, M.; Basse, N.; Edlund, E.; Hubbard, A.; Lin, L.; Lynn, A.; Marmar, E.; Mossessian, D.; Phillips, P.; Schilling, G. **Source:** *Physics of Plasmas*, v 12, n 5, p 56104-1-8, May 2005

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Rice, J.E. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Hubbard, A.E.; Hughes, J.W.; Greenwald, M.J.; LaBombard, B.; Irby, J.H.; Lin, Y.; Marmar, E.S.; Mossessian, D.; Wolfe, S.M.; Wukitch, S.J. **Source:** *Nuclear Fusion*, v 45, n 4, p 251-7, April 2005

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Lynn, Alan Gene (The University of Texas at Austin) **Source:** *ProQuest Dissertations and Theses Global*, 2004

Microturbulent Drift Mode Stability before Internal Transport Barrier Formation in the Alcator C-Mod Radio Frequency Heated H-mode

Redi, M. H.; Dorland, W.; Fiore, C. L.; Bonoli, P. T.; Greenwald, M. J.; Rice, J. E.; Baumgaertel, J. A.; Hahm, T. S.; Hammett, G. W.; Hill, K.; McCune, D. C.; Mikkelsen, D. R.; Rewoldt, G. (Princeton Univ., NJ. Plasma Physics Lab.) **Sponsor:** Department of Energy, Washington, DC. **Report:** PPPL-4000, 40p, Aug 2004

Marginial Stability of Microturbulence near ITB Onset on Alcator C-Mod

Baumgaertel, J. A.; Redi, M. H.; Budny, R. V.; McCune, D. C.; Dorland, W.; Fiore, C. L. (Princeton Univ., NJ. Plasma Physics Lab.) **Sponsor:** Department of Energy, Washington, DC. **Report:** PPPL-3999, 28p, Aug 2004

Benchmarking Nonlinear Turbulence Simulations on Alcator C-Mod

Redi, M. H.; Flore, C. L. (Princeton Univ., NJ. Plasma Physics Lab.) **Sponsor:** Department of Energy, Washington, DC. **Report:** PPPL-3968, 12p, Jun 2004

Assessment of ICRF Antenna Performance in Alcator C-Mod

Schilling, G.; Wukitch, S. J. (Princeton Univ., NJ. Plasma Physics Lab.) **Sponsor:** Department of Energy, Washington, DC. **Report:** PPPL-3995, 12p, Aug 2004

Migration of Alcator C-Mod computer infrastructure to Linux

Fredian, T.W. (MIT Plasma Fusion & Sci. Center, MIT, Cambridge, MA, United States); Greenwald, M.; Stillerman, J.A. **Source:** *Fusion Engineering and Design*, v 71, n 1-4, p 89-93, June 2004

Three-Dimensional Simulation of Gas Conductance Measurement Experiments on Alcator C-Mod

Stotler, D. P.; LaBombard, B. (Princeton Univ., NJ. Plasma Physics Lab.) **Sponsor:** Department of Energy, Washington, DC. **Report:** PPPL-3964, 18p, Jun 2004

Internal transport barrier production and control in Alcator C-Mod

Fiore, C.L. (Plasma Science and Fusion Center, Massachusetts Inst. of Technology, Cambridge, MA 02139, United States); Bonoli, P.T.; Ernst, D.R.; Greenwald, M.J.; Marmar, E.S.; Redi, M.H.; Rice, J.E.; Wukitch, S.J.; Zhurovich, K. **Source:** *Plasma Physics and Controlled Fusion*, v 46, n 12 B, p B281-B291, December 2004

Upper limit on turbulent electron temperature fluctuations in the core of Alcator C-Mod

Watts, C. (New Mexico Tech., Socorro, NM, United States); Yongkyoon In; Heard, J.; Phillips, P.; Lynn, A.; Hubbard, A.; Gandy, R. **Source:** *Nuclear Fusion*, v 44, n 9, p 987-91, Sept. 2004

Impurity plume experiments in the edge plasma of the alcator C-mod tokamak

Gangadhara, S. (Fusion Center, MIT Plasma Sci., Cambridge, MA, United States); LaBombard, B. **Source:** *Plasma Physics and Controlled Fusion*, v 46, n 10, p 1617-46, Oct. 2004

Investigation of performance limiting phenomena in a variable phase ICRF antenna in alcator C-mod

Wukitch, S.J. (Fusion Center, MIT Plasma Sci., Cambridge, MA, United States); Boivin, R.L.; Bonoli, P.T.; Goetz, J.A.; Irby, J.; Hutchinson, I.; Lin, Y.; Parisot, A.; Porkolab, M.; Marmar, E.; Schilling, G.; Wilson, J.R. **Source:** *Plasma Physics and Controlled Fusion*, v 46, n 9, p 1479-91, Sept. 2004

Interpretation of the Dα emission from the high field side of Alcator C-mod

Boswell, C.J. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Terry, J.L.; LaBombard, B.; Lipschultz, B.; Pitcher, C.S. **Source:** *Plasma Physics and Controlled Fusion*, v 46, n 8, p 1247-57, Aug. 2004

Observations of anomalous momentum transport in Alcator C-mod plasmas with no momentum input

Rice, J.E. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Lee, W.D.; Marmar, E.S.; Bonoli, P.T.; Granetz, R.S.; Greenwald, M.J.; Hubbard, A.E.; Hutchinson, I.H.; Irby, J.H.; Lin, Y.; Mossessian, D.; Snipes, J.A.; Wolfe, S.M.; Wukitch, S.J. **Source:** *Nuclear Fusion*, v 44, n 3, p 379-86, March 2004

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Snipes, J.A. (Fusion Center, MIT Plasma Sci., Cambridge, MA, United States); Schmittdiel, D.; Fasoli, A.; Granetz, R.S.; Parker, R.R. **Source:** *Plasma Physics and Controlled Fusion*, v 46, n 4, p 611-20, April 2004

Role of trapped electron mode turbulence in internal transport barrier control in the alcator C-mod Tokamak

Ernst, D.R. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Bonoli, P.T.; Catto, P.J.; Dorland, W.; Fiore, C.L.; Granetz, R.S.; Greenwald, M.; Hubbard, A.E.; Porkolab, M.; Redi, M.H.; Rice, J.E.; Zhurovich, K. **Source:** *Physics of Plasmas*, v 11, n 5, p 2637-48, May 2004

Investigation of ion cyclotron range of frequencies mode conversion at the ion-ion hybrid layer in Alcator C-mod

Lin, Y. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Wukitch, S.; Bonoli, P.; Nelson-Melby, E.; Porkolab, M.; Wright, J.C.; Basse, N.; Hubbard, A.E.; Irby, J.; Lin, L.; Marmar, E.S.; Mazurenko, A.; Mossessian, D.; Parisot, A.; Rice, J.; Wolfe, S.; Phillips, C.K.; Schilling, G.; Wilson, J.R.; Phillips, P.; Lynn, A. **Source:** *Physics of Plasmas*, v 11, n 5, p 2466-72, May 2004

Toroidal rotation and momentum transport in Alcator C-mod plasmas with no momentum input

Rice, J.E. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Lee, W.D.; Marmar, E.S.; Basse, N.P.; Bonoli, P.T.; Greenwald,

M.J.; Hubbard, A.E.; Hughes, J.W.; Hutchinson, I.H.; Ince-Cushman, A.; Irby, J.H.; Lin, Y.; Mossessian, D.; Snipes, J.A.; Wolfe, S.M.; Wukitch, S.J.; Zhurovich, K. **Source:** *Physics of Plasmas*, v 11, n 5, p 2427-32, May 2004

Control of internal transport barriers on Alcator C-mod

Fiore, C.L. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Bonoli, P.T.; Ernst, D.R.; Hubbard, A.E.; Greenwald, M.J.; Lynn, A.; Marmar, E.S.; Phillips, P.; Redi, M.H.; Rice, J.E.; Wolfe, S.M.; Wukitch, S.J.; Zhurovich, K. **Source:** *Physics of Plasmas*, v 11, n 5, p 2480-7, May 2004

Measurements of ion and neutral atom flows and temperatures in the inner and outer midplane scrape-off layers of the alcator C-mod Tokamak

Ghosh, J. (Inst. for Res. in Electron. & Appl. Phys., Univ. of Maryland, College Park, MD, United States); Griem, H.R.; Elton, R.C.; Terry, J.L.; Marmar, E.; Lipschultz, B.; LaBombard, B.; Rice, J.E.; Weaver, J.L. **Source:** *Physics of Plasmas*, v 11, n 3, p 1033-42, March 2004

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Parisot, A. (Plasma Science and Fusion Center, MIT, Cambridge, MA 02139, United States); Wukitch, S.J.; Bonoli, P.; Hughes, J.W.; Labombard, B.; Lin, Y.; Parker, R.; Porkolab, M.; Ram, A.K. **Source:** *Plasma Physics and Controlled Fusion*, v 46, n 11, p 1781-1792, November 2004

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Terry, J.L. (Plasma Science and Fusion Center, MIT, Cambridge, MA 02139); Zweben, S.J.; Bose, B.; Grulke, O.; Marmar, E.S.; Lowrance, J.; Mastrocola, V.; Renda, G. **Source:** *Review of Scientific Instruments*, v 75, n 10 II, p 4196-4199, October 2004

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Furno, I. (Los Alamos National Laboratory, M. S. E526, Los Alamos, NM 87545); Wurden, G.A. **Source:** *Review of Scientific Instruments*, v 75, n 10 II, p 4112-4114, October 2004

Local threshold conditions and fast transition dynamics of the L-H transition in Alcator C-Mod

Hubbard, A.E. (MIT Plasma Science and Fusion Center, Cambridge, MA 02139, United

States); Carreras, B.A.; Basse, N.P.; Del-Castillo-Negrete, D.; Hughes, J.W.; Lynn, A.; Marmar, E.S.; Mossessian, D.; Phillips, P.; Wukitch, S. **Source:** *Plasma Physics and Controlled Fusion*, v 46, n 5 SUPPL. A, p A95-A104, May 2004

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Lynn, A.G. (Fusion Research Center, University of Texas at Austin, Austin, TX, United States); Phillips, P.E.; Hubbard, A.E.; Wukitch, S.J. **Source:** *Plasma Physics and Controlled Fusion*, v 46, n 5 SUPPL. A, p A61-A70, May 2004

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Greenwald, M. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States), **Source:** *Computer Physics Communications*, Volume 164, Issues 1-3, 1-15, Pages 1-8, December 2004

Interpretive modeling of the Alcator C -Mod divertor

Lisgo, Steven William (University of Toronto (Canada)) **Source:** *ProQuest Dissertations and Theses Global*, 2003

Lower hybrid low power microwave active control system design, installation and testing on Alcator C-Mod

Terry, D. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Burke, W.; Dekow, G.; Grimes, M.; Parker, R.; Basse, N.; Bosco, J.; Rokhman, Y.; Stillerman, J. **Source:** *20th IEEE/NPSS Symposium on Fusion Engineering (IEEE Cat. No.03CH37469C)*, p 524-7, 2003

Alcator C-Mod non-axisymmetric control coils design and fabrication

Vieira, R. (Plasma Sci. Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Rosati, J.; Fitzgerald, E.; Beck, W.; Wolfe, S.; Hutchinson, I.; Irby, J.; Cochran, W.; Terry, D. **Source:** *20th IEEE/NPSS Symposium on Fusion Engineering (IEEE Cat. No.03CH37469C)*, p 569-72, 2003

Broadband amplifiers for the active MHD diagnostic on Alcator C-Mod

Burke, W. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Tecnology, Cambridge, MA, United States); Cochran, W.; Schimttdiel, D.; Snipes, J.; Zhong, X. **Source:** *20th IEEE/NPSS Symposium on Fusion Engineering (IEEE Cat. No.03CH37469C)*, p 363-6,

2003

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Burke, W. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States) **Source:** *20th IEEE/NPSS Symposium on Fusion Engineering (IEEE Cat. No.03CH37469C)*, p 520-3, 2003

Stability of Microturbulent Drift Modes during Internal Transport Barrier Formation in the Alcator C-Mod Radio Frequency Heated H-mode

Redi, M. H.; Fiore, C. L.; Dorland, W.; Mikkelsen, D. R.; Rewoldt, G. (Princeton Univ., NJ. Plasma Physics Lab.) **Sponsor:** Department of Energy, Washington, DC. **Report:** PPPL-3903, one CD-ROM contains 42 page document, Nov 2003

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Burke, W. (MIT Plasma Science and Fusion Center, 190 Albany Street, Cambridge, MA 02139); Cochran, W.; Schimttdiel, D.; Snipes, J.; Zhong, X. **Source:** *Proceedings - Symposium on Fusion Engineering*, p 363-366, 2003, *20th IEEE/NPSS Symposium on Fusion Engineering, SOFE 03*

Lower hybrid low power microwave active control system design, installation and testing on Alcator C-mod

Terry, D. (MIT Plasma Science and Fusion Center, 190 Albany Street, Cambridge, MA 02139); Burke, W.; Dekow, G.; Grimes, M.; Parker, R.; Basse, N.; Bosco, J.; Rokhman, Y.; Stillerman, J. **Source:** *Proceedings - Symposium on Fusion Engineering*, p 524-527, 2003, *20th IEEE/NPSS Symposium on Fusion Engineering, SOFE 03*

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Beck, W.K. (MIT Plasma Science and Fusion Center, 190 Albany St., Cambridge, MA 02139); Koert, P.; Wukitch, S.; Vieira, R.; Ellis, R.; Schilling, G. **Source:** *Proceedings - Symposium on Fusion Engineering*, p 492-495, 2003, *20th IEEE/NPSS Symposium on Fusion Engineering, SOFE 03*

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Burke, W. (MIT Plasma Science and Fusion Center, 190 Albany Street, Cambridge, MA 02139) **Source:** *Proceedings - Symposium on Fusion Engineering*, p 520-523, 2003, *20th IEEE/NPSS Symposium on Fusion Engineering, SOFE 03*

Analysis of 4-Strap ICRF Antenna Performance in Alcator C-Mod

Schilling, G.; Wukitch, S. J.; Boivin, R. L.; Goetz, J. A.; Hosea, J. C. (Princeton Univ., NJ. Plasma Physics Lab.) **Sponsor:** Department of Energy, Washington, DC. **Report:** PPPL-3849, one CD-ROM contains 8 page document, Jul 2003

Control and data acquisition system for lower hybrid current drive in Alcator C-Mod

Basse, N.P. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Bosco, J.; Fredian, T.W.; Grimes, M.; Kambouchev, N.D.; Lin, Y.; Parker, R.R.; Rokhman, Y.I.; Stillerman, J.A.; Terry, D.R.; Wukitch, S.J. **Source:** *AIP Conference Proceedings*, n 694, p 243-6, 2003

Analysis of 4-strap ICRF antenna performance in Alcator C-Mod

Schilling, G. (Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Wukitch, S.J.; Boivin, R.L.; Goetz, J.A.; Hosea, J.C.; Irby, J.H.; Lin, Y.; Parisot, A.; Porkolab, M.; Wilson, J.R. **Source:** *AIP Conference Proceedings*, n 694, p 166-9, 2003

Study of ion cyclotron range of frequencies mode conversion in the Alcator C-Mod tokamak

Lin, Y. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Wukitch, S.J.; Bonoli, P.T.; Mazurenko, A.; Nelson-Melby, E.; Porkolab, M.; Wright, J.C.; Hutchinson, I.H.; Marmar, E.S.; Mossessian, D.; Wolfe, S.; Phillips, C.K.; Schilling, G.; Phillips, P. **Source:** *AIP Conference Proceedings*, n 694, p 50-7, 2003

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Wukitch, S.J. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Bonoli, P.T.; Fiore, C.; Hutchinson, I.H.; Lin, Y.; Marmar, E.; Parisot, A.; Porkolab, M.; Rice, J.; Schilling, G. **Source:** *AIP Conference Proceedings*, n 694, p 178-81, 2003

Construction, calibration and testing of a multi-waveguide array for the application of LHCD on Alcator C-MOD

Wilson, J.R. (Princeton Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Bernabei, S.; Fredd, E.; Greenough, N.; Hosea, J.C.; Kung, C.C.; Loesseer, G.D. **Source:** *AIP Conference Proceedings*, n 694, p 283-6, 2003

Optimized AT target plasma studies in Alcator C-Mod with Ip-ramp and intense

ICRH

Porkolab, M. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Bonoli, P.T.; Lin, Y.; Wukitch, S.J.; Fiore, C.; Hubbard, A.; Irby, J.; Lin, L.; Marmar, E.; Parker, R.; Rice, J.; Schilling, G.; Wilson, J.R.; Wolfe, S.; Yuh, H.; Zhurovich, K. **Source:** *AIP Conference Proceedings*, n 694, p 162-5, 2003

Investigation of ICRF coupling resistance in Alcator C-Mod tokamak

Parisot, A. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Wukitch, S.J.; Ram, A.; Parker, R.; Lin, Y.; Hughes, J.W.; Labombard, B.; Bonoli, P.; Porkolab, M. **Source:** *AIP Conference Proceedings*, n 694, p 158-61, 2003

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Marmar, E.S. (MIT, Cambridge, MA, United States); Bai, B.; Boivin, R.L.; Bonoli, P.T.; Boswell, C.; Bravenec, R.; Carreras, B.; Ernst, D.; Fiore, C.; Gangadhara, S.; Gentle, K.; Goetz, J.; Granetz, R.; Greenwald, M.; Hallatschek, K.; Hastie, J.; Hosea, J.; Hubbard, A.; Hughes, J.W.; Hutchinson, I.; In, Y.; Irby, J.; Jennings, T.; Kopon, D.; Kramer, G.; LaBombard, B.; Lee, W.D.; Lin, Y.; Lipschultz, B.; Liptac, J.; Lynn, A.; Marr, K.; Maqueda, R.; Melby, E.; Mikkelsen, D.; Mossessian, D.; Nazikian, R.; Nevins, W.M.; Parker, R.; Pedersen, T.S.; Phillips, C.K.; Phillips, P.; Pitcher, C.S.; Porkolab, M.; Ramos, J.; Redi, M.; Rice, J.; Rogers, B.N.; Rowan, W.L.; Sampsell, M.; Schilling, G.; Scott, S.; Snipes, J.; Snyder, P.; Stotler, D.; Taylor, G.; Terry, J.L.; Wilson, H.; Wilson, J.R.; Wolfe, S.M.; Wukitch, S.; Xu, X.Q.; Youngblood, B.; Yuh, H.; Zhurovich, K.; Zweben, S. **Source:** *Nuclear Fusion*, v 43, n 12, p 1610-18, Dec. 2003

Neutral particle analysis of ICRF heated discharges on Alcator C-Mod

Lee, W.D. (Massachussetts Inst. of Technol., Cambridge, MA, United States); Boivin, R.L.; Bonoli, P.T.; Fiore, C.L.; Hubbard, A.; Irby, J.; Nelson-Melby, E.; Porkolab, M.; Wukitch, S.J. **Source:** *Plasma Physics and Controlled Fusion*, v 45, n 8, p 1465-75, Aug. 2003

Ion cyclotron range of frequencies mode conversion electron heating in deuterium-hydrogen plasmas in the Alcator C-Mod tokamak

Lin, Y. (Plasma Fusion Center, MIT, Cambridge, MA, United States); Wukitch, S.J.; Bonoll, P.T.; Marmar, E.; Mossessian, D.; Nelson-Melby, E.; Phillips, P.; Porkolab, M.; Schilling, G.; Wolfe, S.; Wright, J. **Source:** *Plasma Physics and Controlled Fusion*, v 45, n 6, p 1013-26, June 2003

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Rice, J.E. (Plasma Fusion Center, MIT, Cambridge, MA, United States); Bonoli, P.T.; Fiore, C.L.; Lee, W.D.; Marmar, E.S.; Wukitch, S.J.; Granetz, R.S.; Hubbard, A.E.; Hughes, J.W.; Irby, J.H.; Lin, Y.; Mossessian, D.; Wolfe, S.M.; Zhurovich, K.;

Greenwald, M.J.; Hutchinson, I.H.; Porkolab, M.; Snipes, J.A. **Source:** *Nuclear Fusion*, v 43, n 8, p 781-8, Aug. 2003

Design of a compact lower hybrid coupler for Alcator C-Mod

Bernabei, S. (Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Hosea, J.C.; Kung, C.C.; Loesser, G.D.; Rushinski, J.; Wilson, J.R. **Source:** *Fusion Science and Technology*, v 43, n 2, p 145-52, March 2003

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LaBombard, B. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Gangadhara, S.; Lipschultz, B.; Pitcher, C.S. **Source:** *Journal of Nuclear Materials*, v 313-316, p 995-9, March 2003

Recycling impurity compression in Alcator C-mod divertor

Chung, T. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Pitcher, C.S.; Labombard, B.; Lipschultz, B.; Terry, J.L.; Rice, J.E.; Goetz, J.A.; Elder, J.D.; Stangeby, P.C. **Source:** *Journal of Nuclear Materials*, v 313-316, p 990-4, March 2003

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Gangadhara, S. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); LaBombard, B. **Source:** *Journal of Nuclear Materials*, v 313-316, p 1167-72, March 2003

Observations of the turbulence in the scrape-off-layer of Alcator C-mod and comparisons with simulation

Terry, J.L. (Fusion Center, MIT Plasma Sci., Cambridge, MA, United States); Zweben, S.J.; Hallatschek, K.; LaBombard, B.; Maqueda, R.J.; Bai, B.; Boswell, C.J.; Greenwald, M.; Kopon, D.; Nevins, W.M.; Pitcher, C.S.; Rogers, B.N.; Stotler, D.P.; Xu, X.Q. **Source:** *Physics of Plasmas*, v 10, n 5, p 1739-47, May 2003

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Mossessian, D.A. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Snyder, P.; Hubbard, A.; Hughes, J.W.; Greenwald, M.; LaBombard, B.; Snipes, J.A.; Wolfe, S.; Wilson, H. **Source:** *Physics of Plasmas*, v 10, n 5, p 1720-6, May 2003

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Hughes, J.W. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol.,

Cambridge, MA, United States); Mossessian, D.; Zhurovich, K.; DeMaria, M.; Jensen, K.; Hubbard, A. **Source:** *Review of Scientific Instruments*, v 74, n 3, p 1667-70, March 2003

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Greenwald, M.**, Source:** *PPCF*, 44, pgs. R27-R80, 2002

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Titus, P.H. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States) **Source:** *Proceedings of the 19th IEEE/IPSS Symposium on Fusion Engineering. 19th SOFE (Cat. No.02CH37231)*, p 27-30, 2002

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Rogister, A.L. (Inst. fur Plasmaphys., Forschungszentrum Julich GmbH, Julich, Germany); Rice, J.E.; Nicolai, A.; Ince-Cushman, A.; Gangadhara, S. **Source:** *Nuclear Fusion*, v 42, n 9, p 1144-54, Sept. 2002

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Rost, J.C. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Porkolab, M.; Boivin, R.L. **Source:** *Physics of Plasmas*, v 9, n 4, p 1262-70, April 2002

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Zweben, S.J. (Princeton Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Stotler, D.P.; Terry, J.L.; LaBombard, B.; Greenwald, M.; Muterspaugh, M.; Pitcher, C.S.; Hallatschek, K.; Maqueda, R.J.; Rogers, B.; Lowrance, J.L.; Mastrocola, V.J.; Renda, G.F. **Source:** *Physics of Plasmas*, v 9, n 5, p 1981-9, May 2002

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Stotler, D. P.; Pitcher, C. S.; Boswell, C. J.; LaBombard, B.; Terry, J. L.; Elder, J. D.; Lisgo, S. (Princeton Univ., NJ. Plasma Physics Lab.) **Sponsor:** Department of Energy,

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Schilling, G. (Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Hosea, J.C.; Wilson, J.R.; Beck, W.; Boivin, R.L.; Bonoli, P.T.; Gwinn, D.; Lee, W.D.; Nelson-Melby, E.; Porkolab, M.; Vieira, R.; Wukitch, S.J.; Goetz, J.A. **Source:** *AIP Conference Proceedings*, n 595, p 186-9, 2001

The relation between impurity neutral and impurity ion compression in the Alcator C-Mod divertor

Goetz, J.A. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Pitcher, C.S.; LaBombard, B.; Lipschultz, B.; Rice, J.E.; Terry, J.L. **Source:** *Nuclear Fusion*, v 41, n 12, p 1751-4, Dec. 2001

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Hutchinson, I.H. (Plasma Fusion Center, MIT, Cambridge, MA, United States); Boivin, R.; Bonoli, P.T.; Boswell, C.; Bravenec, R.; Bretz, N.L.; Chatterjee, R.; Chung, T.; Eisner, E.; Fiore, C.; Gangadhara, S.; Gentle, K.; Goetz, J.A.; Granetz, R.S.; Greenwald, M.J.; Hosea, J.C.; Hubbard, A.E.; Hughes, J.; In, Y.; Irby, J.; LaBombard, B.; Lin, Y.; Lipschultz, B.; Maqueda, R.J.; Marmar, E.S.; Mazurenko, A.; Mikkelsen, D.; Mossessian, D.; Nachtreib, R.; Nazikian, R.; Nelson-Melby, E.; Pappas, D.; Parker, R.R.; Sunn Pedersen, T.; Phillips, P.; Pitcher, C.S.; Porkolab, M.; Rice, J.E.; Rowan, W.; Schilling, G.; Snipes, J.A.; Talylor, G.; Terry, J.L.; Wilson, J.R.; Wolfe, S.M.; Wukitch, S.J.; Yuh, H.; Zweben, S.J.; Acedo, P.; Brambilla, M.; Carreras, B.A.; Gandy, R.; Hallock, G.A.; Dorland, W.; Johnson, D.; Krashennikova, N.; Phillips, C.; Tutt, T.; Watts, C.; Umansky, M. **Source:** *Nuclear Fusion*, v 41, n 10, p 1391-400, Oct. 2001

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Carreras, B.A. (Oak Ridge Nat. Lab., Oak Ridge, TN, United States); Lynch, V.E.; LaBombard, B. **Source:** *Physics of Plasmas*, v 8, n 8, p 3702-7, Aug. 2001

The quasi-coherent signature of enhanced Dα H-mode in Alcator C-Mod

Snipes, J.A. (Plasma Fusion Center, MIT, Cambridge, MA, United States); LaBombard, B.; Greenwald, M.; Hutchinson, I.H.; Irby, J.; Lin, Y.; Mazurenko, A.; Porkolab, M. **Source:** *Plasma Physics and Controlled Fusion*, v 43, n 4, p L23-30, April 2001

Internal transport barriers on Alcator C-Mod

Fiore, C.L. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Rice, J.E.; Bonoli, P.T.; Boivin, R.L.; Goetz, J.A.; Hubbard, A.E.; Hutchinson, I.H.; Granetz, R.S.; Greenwald, M.J.; Marmar, E.S.; Mossessian, D.; Porkolab, M.; Taylor, G.; Snipes, J.; Wolfe, S.M.; Wukitch, S.J. **Source:** *Physics of Plasmas*, v 8, n 5, p 2023-8, May 2001

Molybdenum sources and transport in Alcator C-Mod

Lipschultz, B. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Pappas, D.A.; LaBombard, B.; Rice, J.E.; Smith, D.; Wukitch, S. **Source:** *Journal of Nuclear Materials*, v 290-293, p 286-90, March 2001

Digital-image capture system for the IR camera used in Alcator C-Mod

Maqueda, R.J. (Los Alamos Nat. Lab., Los Alamos, NM, United States); Wurden, G.A.; Terry, J.L.; Gaffke, J. **Source:** *Review of Scientific Instruments*, v 72, n 1, pt.1-2, p 927-30, Jan. 2001

Observations of impurity toroidal rotation suppression with ITB formation in ICRF and ohmic H mode Alcator C-Mod plasmas

Rice, J.E. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Boivin, R.L.; Bonoli, P.T.; Goetz, J.A.; Granetz, R.S.; Greenwald, M.J.; Hutchinson, I.H.; Marmar, E.S.; Schilling, G.; Snipes, J.A.; Wolfe, S.M.; Wukitch, S.J.; Fiore, C.L.; Irby, J.H.; Mossessian, D.; Porkolab, M. **Source:** *Nuclear Fusion*, v 41, n 3, p 277-84, March 2001

Simulations of beam-emission spectroscopy on Alcator C-Mod

Sampsell, M.B. (Fusion Res. Center, Texas Univ., Austin, TX, United States); Bravenec, R.V.; Rowan, W.L.; Eisner, E.C.; Patterson, D.M.; Bretz, N.L.; Boivin, R.L.; Hubbard, A.E.; Irby, J.H.; Marmar, E.S.; Terry, J.L. **Source:** *Review of Scientific Instruments*, v 72, n 1, pt.1-2, p 987, Jan. 2001

Charge exchange recombination spectroscopy on Alcator C-Mod

Eisner, E.C. (Fusion Res. Center, Texas Univ., Austin, TX, United States); Rowan, W.L. **Source:** *Review of Scientific Instruments*, v 72, n 1, pt.1-2, p 1004-7, Jan. 2001

Divertor bypass in the Alcator C-Mod tokamak

Pitcher, C.S. (Fusion Center, MIT, Cambridge, MA, United States); LaBombard, B.;

Danforth, R.; Pina, W.; Silveira, M.; Parkin, B. **Source:** *Review of Scientific Instruments*, v 72, n 1, pt.1-2, p 103-7, Jan. 2001

High-resolution edge Thomson scattering measurements on the Alcator C-Mod tokamak

Hughes, J.W. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Mossessian, D.A.; Hubbard, A.E.; Marmar, E.S.; Johnson, D.; Simon, D. **Source:** *Review of Scientific Instruments*, v 72, n 1, pt.1-2, p 1107-10, Jan. 2001

Applications of visible CCD cameras on the Alcator C-Mod tokamak

Boswell, C.J. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Terry, J.L.; Lipschultz, B.; Stillerman, J. **Source:** *Review of Scientific Instruments*, v 72, n 1, pt.1-2, p 935-9, Jan. 2001

Cross-field plasma transport and main-chamber recycling in diverted plasmas on Alcator C-Mod

LaBombard, B. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Umansky, M.V.; Boivin, R.L.; Goetz, J.A.; Hughes, J.; Lipschultz, B.; Mossessian, D.; Pitcher, C.S.; Terry, J.L. **Source:** *Nuclear Fusion*, v 40, n 12, p 2041-60, Dec. 2000

Radial impurity transport in the H mode transport barrier region in Alcator C-Mod

Marmar, E.S. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Rice, J.E.; Terry, J. **Source:** *Nuclear Fusion*, v 40, n 10, p 1795-804, Oct. 2000

Resistive n=1 modes in reversed magnetic shear Alcator C-Mod plasmas

In, Y. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Ramos, J.J.; Hubbard, A.E.; Hutchinson, I.H.; Porkolab, M.; Snipes, J.; Wolfe, S.M.; Bondeson, A. **Source:** *Nuclear Fusion*, v 40, n 8, p 1463-8, Aug. 2000

Investigation of fast particle driven modes on Alcator C-Mod

Snipes, J.A. (Plasma Fusion Center, MIT, Cambridge, MA, United States); Fasoli, A.; Bonoli, P.; Miglinolo, S.; Porkolab, M.; Rice, J.E.; Takase, Y.; Wolfe, S.M. **Source:** *Plasma Physics and Controlled Fusion*, v 42, n 4, p 381-8, April 2000

Mode conversion electron heating in Alcator C-Mod: Theory and experiment

Bonoli, P.T. (Plasma Fusion Center, MIT, Cambridge, MA, United States); Brambilla, M.; Nelson-Melby, E.; Phillips, C.K.; Porkolab, M.; Schilling, G.; Taylor, G.; Wukitch, S.J.; Boivin, R.L.; Boswell, C.J.; Fiore, C.L.; Gangadhara, S.; Goetz, J.; Granetz, R.; Greenwald, M.; Hubbard, A.E.; Hutchinson, I.H.; In, Y.; Irby, J.; LaBombard, B.; Lipschultz, B.; Marmar, E.; Mazurenko, A.; Nachtrieb, R.; Pappas, D.; Pitcher, C.S.; Reardon, J.; Rice, J.; Rowan, W.L.; Snipes, J.A.; Takase, Y.; Terry, J.; Wolfe, S.M. **Source:** *Physics of Plasmas*, v 7, n 5, p 1886-93, May 2000

Studies of EDA H-Mode in Alcator C-Mod

Greenwald, M., et al. Source: *Plasma Phys. Control. Fusion* 42, No 5A, A263-A269, May 2000

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Reardon, J. (Plasma Sci. & Fusion Center, Massachusetts Inst. of Technol., Cambridge, MA, United States); Bonoli, P.T.; Porkolab, M.; Takase, Y.; Wukitch, S.J. **Source:** *Physics Letters A*, v 264, n 5, p 407-11, 3 Jan. 2000

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Stotler, D. P.; Pitcher, C. S.; Boswell, C. J.; Chung, T. K.; LaBombard, B.; Lipschultz, B.; Terry, J. L.; Kanzleiter, R. J. (Princeton Univ., NJ. Plasma Physics Lab.) **Sponsor:** Department of Energy, Washington, DC. **Report:** PPPL-3523, 19p, Nov 2000

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Schilling, G. (Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Hosea, J.C.; Wilson, J.R.; Bonoli, P.T.; Lee, W.D.; Nelson-Melby, E.; Porkolab, M.; Wukitch, S.J. **Source:** *AIP Conference Proceedings*, n 485, p 429-32, 1999

Failure analysis and design improvement of the Alcator C-Mod toroidal field coil sliding joint

Titus, P.H. (Stone & Webster Eng. Corp., Boston, MA, United States); Becker, H.; Gwinn, D.; Rettman, K.; Stahle, P. **Source:** *18th IEEE/NPSS Symposium on Fusion Engineering. Symposium Proceedings (Cat. No.99CH37050)*, p 427-32, 1999

Long term retention of deuterium and tritium in Alcator C-Mod

Wampler, W.R. (Sandia Natl Lab, Albuquerque, United States); Skinner, C.H.; Pitcher, C.S.; LaBombard, B.; Lipschultz, B.; Fiore, C. **Source:** *Proceedings - Symposium on Fusion Engineering*, p 267-270, 1999

Central impurity toroidal rotation in ICRF heated Alcator C-Mod plasmas

Rice, J.E. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Bonoli,

P.T.; Goetz, J.A.; Greenwald, M.J.; Hutchinson, I.H.; Marmar, E.S.; Porkolab, M.; Wolfe, S.M.; Wukitch, S.J.; Chang, C.S. **Source:** *Nuclear Fusion*, v 39, n 9, p 1175-86, Sept. 1999

Coupled Monte Carlo neutral-fluid plasma simulation of Alcator C-Mod divertor plasma near detachment

Stotler, D.P. (Plasma Phys. Lab., Princeton Univ., Princeton, NJ, United States); Vesey, R.A.; Coster, D.P.; Karney, C.F.F.; LaBombard, B.; Lipschultz, B.; Pitcher, C.S.; Schneider, R. **Source:** *Journal of Nuclear Materials*, v 266-269, p 947-52, March 1999

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Boivin, R.L. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Goetz, J.A.; Marmar, E.S.; Rice, J.E.; Terry, J.L. **Source:** *Review of Scientific Instruments*, v 70, n 1, pt.1-2, p 260-4, Jan. 1999

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Pigarov, A.Y. (Plasma Fusion Center, MIT, Cambridge, MA, United States); Terry, J.L.; Lipschultz, B. **Source:** *Plasma Physics and Controlled Fusion*, v 40, n 12, p 2051-68, Dec. 1998

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Gorman, S.V. (LMITCO Inc., Idaho Falls, ID, United States); Carmack, W.J.; Hembree, P.B. **Source:** *Fusion Technology*, v 34, n 3, pt.2, p 745-9, Nov. 1998

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Wampler, W. R.; LaBombard, B.; Lipshultz, B.; Pappas, D.; Pitcher, C. S. (USDOE Office of Energy Research, Washington, DC (United States).) **Report:** SAND-97-2736C, 14p, May 1998

3D, coupled electromagnetic, thermal, current diffusion in the finger joints of the Alcator C-Mod toroidal field coils

Leonard Myatt, R. (Stone & Webster Engineering Corp); Titus, Peter H. **Source:** *Proceedings - Symposium on Fusion Engineering*, v 2, p 713-716, 1998

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Hubbard, A.E. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Boivin, R.L.; Drake, J.F.; Greenwald, M.; In, Y.; Irby, J.H.; Rogers, B.N.; Snipes, J.A.

Source: *Plasma Physics and Controlled Fusion*, v 40, n 5, p 689-92, May 1998

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Wukitch, S.J. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Bonoli, P.T.; Porkolab, M.; Phillips, C.K.; Schilling, G.; Wilson, J.R.; Takase, Y. **Source:** *Second Europhysics Topical Conference on Radio Frequency Heating and Current Drive of Fusion Devices. Contributed Papers*, p 5-8, 1998

Ultrahigh densities and volume recombination inside the separatrix of the Alcator C-Mod tokamak

Lipschultz, B. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Terry, J.L.; Boswell, C.; Hubbard, A.; LaBombard, B.; Pappas, D.A. **Source:** *Physical Review Letters*, v 81, n 5, p 1007-10, 3 Aug. 1998

Alcator C-Mod tokamak and recent results

Irby, J. (Plasma Science and Fusion Cent, Cambridge, United States); Granetz, R.; Myatt, L.; Titus, P. **Source:** *Proceedings - Symposium on Fusion Engineering*, v 1, p 34-39, 1998

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Bombarda, F. (ENEA, Frascati, Italy); Bonoli, P.T.; Coppi, B.; Granetz, R.S.; Hubbard, A.; IRby, J.H.; Migliuolo, S.; O'Shea, P.; Rice, J.E.; Takase, Y.; Wolfe, S.M.; Huysmans, G.T.A.; Kerner, W. **Source:** *Nuclear Fusion*, v 38, n 12, p 1861-9, Dec. 1998

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Terry, J.L. (Plasma Fusion Center, MIT, Cambridge, MA, United States); Lipschultz, B.; Pigarov, A.Yu.; Krasheninnikov, S.I.; LaBombard, B.; Lumma, D.; Ohkawa, H.; Pappas, D.; Umansky, M. **Source:** *Physics of Plasmas*, v 5, n 5, p 1759-66, May 1998

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Greenwald, M. (Plasma Fusion Center, MIT, Cambridge, MA, United States); Schachter, J.; Dorland, W.; Granetz, R.; Hubbard, A.; Rice, J.; Snipes, J.A.; Stek, P.; Wolfe, S. **Source:** *Plasma Physics and Controlled Fusion*, v 40, n 5, p 789-92, May 1998

Electron cyclotron discharge cleaning (ECDC) experiments on Alcator C-Mod

Nachtrieb, R. T.; LaBombard, B. L.; Terry, J. L.; Reardon, J. C.; Rowan, W. L. (USDOE Office of Energy Research, Washington, DC (United States).) **Report:** SAND-98-1237C, 11p, May 1998

3D, coupled electromagnetic, thermal, current diffusion in the finger joints of the Alcator C-Mod toroidal field coils

Myatt, R.L. (Plasma Fusion Center, MIT, Cambridge, MA, United States); Titus, P.H. **Source:** *17th IEEE/NPSS Symposium Fusion Engineering (Cat. No.97CH36131)*, p 713-16 vol.2, 1998

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Snipes, J.A. (Plasma Fusion Center, MIT, Cambridge, MA, United States); Granetz, R.S.; Greenwald, M.; Hubbard, A.E.; Hutchinson, I.H.; Irby, J.; Kesner, J.; Migliuolo, S.; Pedersen, T.S.; Ramos, J.; Rice, J.; Stek, P.C.; Takase, Y.; Wolfe, S.M. **Source:** *Plasma Physics and Controlled Fusion*, v 40, n 5, p 765-70, May 1998

Comments on particle and energy balance in the edge plasma of Alcator C-Mod

Umansky, M.V. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Krasheninnikov, S.I.; LaBombard, B.; Terry, J.L. **Source:** *Physics of Plasmas*, v 5, n 9, p 3373-6, Sept. 1998

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Hubbard, A.E. (Plasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Boivin, R.L.; Granetz, R.S.; Greenwald, M.; Hutchinson, I.H.; Irby, J.H.; In, Y.; Kesner, J.; LaBombard, B.; Lin, Y.; Rice, J.E.; Pedersen, T.S.; Snipes, J.A.; Stek, P.C.; Takase, Y.; Wolfe, S.M.; Wukitch, S. **Source:** *Physics of Plasmas*, v 5, n 5, p 1744-51, May 1998

Observations of central toroidal rotation in ICRF heated Alcator C-MOD plasmas

Rice, J.E. (Flasma Sci. & Fusion Center, MIT, Cambridge, MA, United States); Greenwald, M.; Hutchinson, I.H.; Marmar, E.S.; Takase, Y.; Wolfe, S.T.; Bombarda, F. **Source:** *Nuclear Fusion*, v 38, n 1, p 75-85, Jan. 1998

The Alcator-C-Mod tokamak and recent results

Irby, J. (Alcator Project, Plasma Sci. & Fusion Center, Cambridge, MA, United States); Granetz, R.; Myatt, L.; Titus, P. **Source:** *17th IEEE/NPSS Symposium Fusion Engineering (Cat. No.97CH36131)*, p 34-9 vol.1, 1998