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Title:	Introductory Materials for NPAC Committee Members 1)Instructions for the Los Alamos National Laboratory Fiscal Year 2010 Capability Reviews 2)NPAC Strategic Capability Planning 3)Summary self-assessment for the Nuclear and Particle Physics, Astrophysics and Cosmology (NPAC) Capability Review 14-16 April 2010 4) NPAC Selected Statistics CY207-2010
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Intended for:	NPAC Committee Members

Los Alamos
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Instructions for the Los Alamos National Laboratory Fiscal Year 2010 Capability Reviews

Introduction

Los Alamos National Laboratory (LANL) uses external peer review to measure and continuously improve the quality of its science, technology and engineering (STE). LANL uses capability reviews to assess the STE quality and institutional integration and to advise Laboratory Management on the current and future health of the STE. Capability reviews address the STE integration that LANL uses to meet mission requirements. STE capabilities are define to cut across directorates providing a more holistic view of the STE quality, integration to achieve mission requirements, and mission relevance. The scope of these capabilities necessitate that there will be significant overlap in technical areas covered by capability reviews (e.g., materials research and weapons science and engineering). In addition, LANL staff may be reviewed in different capability reviews because of their varied assignments and expertise. LANL plans to perform a complete review of the Laboratory's STE capabilities (hence staff) in a three-year cycle. The principal product of an external review is a report that includes the review committee's assessments, commendations, and recommendations for STE.

The Capability Review Committees serve a dual role of providing assessment of the Laboratory's technical contributions and integration towards its missions and providing advice to Laboratory Management. The assessments and advice are documented in reports prepared by the Capability Review Committees that are delivered to the Director and to the Principal Associate Director for Science, Technology and Engineering (PADSTE). This report will be used by Laboratory Management for STE assessment and planning. The report is also provided to the Department of Energy (DOE) as part of LANL's Annual Performance Plan and to the Los Alamos National Security (LANS) LLC's Science and Technology Committee (STC) as part of its responsibilities to the LANS Board of Governors.

LANL has defined fifteen STE capabilities. Table 1 lists the seven STE capabilities that LANL Management (Director, PADSTE, technical Associate Directors) have identified for review in Fiscal Year (FY) 2010.

These instructions identify responsibilities and provide guidance to those organizing, participating in and performing capability reviews at LANL in FY 2010 These instructions have been refined based on experiences with capability reviews from 2007 - 2009. Any questions or comments on these instructions should be directed to the Program Manager for the LANL Science and Technology Base Programs Peer Review and Metrics Office at stbprm-admin@lanl.gov or 505-667-7824.

Table 1. FY 2010 LANL science, technology and engineering capability reviews, organizing associate director (AD), and Los Alamos National Security, LLC Science and Technology Committee point-of-contact (STC POC).

Capability	Organizing AD	STC POC/co-POC
Chemical Sciences	ADCLES	Bercaw/Navrotsky
Computational Physics and Applied Math	ADTSC	Karin/Long
Earth and Space Sciences	ADCLES	Beckwith/Vogt
Electrodynamics and Accelerators	ADEPS	Falcone/Vogt
Materials Research	ADEPS	Navrotsky/Bercaw
Nuclear Physics, Astrophysics and Cosmology	ADTSC	Rosner/Vogt
Weapons Science	ADW	Peddicord/Vogt

Roles and Responsibilities

LANL Director/PADSTE

1. Determines capabilities to be reviewed and review schedule.
2. Appoints an Organizing AD (OAD) for each capability review.
3. Works with the OAD to create a specific charge for each capability review.
4. Participates in Capability Review Committee member selection as needed.
5. In conjunction with the STC Chair approves the Capability Review Chair and members.
6. Invites the Capability Review Chair and members.
7. Hosts the Capability Review Chairs meeting before the review cycle starts.
8. Provides the charge to the Capability Review.
9. Attends executive session at closeout.
10. Ensures report is delivered by requested deadline.
11. Provides the Capability Review report to the STC Chair for distribution to the STC.
12. Addresses the Capability Review recommendations through the PADSTE Management Review Board assigning actions and resources. The PADSTE will determine if the actions are tracked through the LANL performance tracking system.
13. Incorporates review recommendations and issues into LANL STE planning and assigns actions.
14. Provides summary response for all capability reviews to Capability Review Committee Chairs and to the STC Chair.

LANS, LLC STC Chair (STC Chair)

1. Appoints STC members to serve as the point-of-contact (POC) and co-point-of-contact (co-POC) for each Capability Review Committee.
2. In conjunction with the LANL Director/PADSTE, approves the Capability Review Committee Chair and members.
3. The STC Chair and/or the Vice Chair may attend any Capability Review meeting as observers. Up to 2 STC members (including Chair and Vice Chair, as coordinated through the STC Chair) may attend a Capability Review meeting as observers. Observers may participate in discussions and attend all sessions, but may not participate in drafting the report.

LANS, LLC STC Point of Contact (POC) / co-Point of Contact (co-POC)

1. Working with the Organizing AD (OAD), compiles a list of potential Capability Review Committee members based on input from the Laboratory, University of California (UC), and STC members. (UC Office of the President (UCOP) collects input from UC, including from the Academic Senate). At least one and a maximum of two LLNL staff members and at least one University of California faculty member are to be named to each Capability Review Committee. The POC does not count for either of these requirements.

2. Working with the OAD, prioritizes the list of potential Capability Review Committee Chairs and members. The list is given to the PADSTE and the STC Chair for approval.
3. The POC or OAD, as appropriate, contacts the recommended Capability Review Chair to ask if the person will serve; the PADSTE officially invites the Chair.
4. Reviews the prioritized Capability Review Committee membership candidate list with the selected Capability Review Chair and OAD; the STC Chair and PADSTE are notified of any changes.
5. Works with the Capability Review Committee Chair and OAD to identify potential dates for the Capability Review meeting.
6. With dates in hand, the POC, OAD, or Capability Review Committee Chair, as appropriate, contacts the proposed Capability Review Committee members regarding their willingness to serve until approximately 9 members, including the Chair, are enlisted. At least one and a maximum of two LLNL staff members and at least one University of California faculty member are to be named to each Capability Review Committee. The Capability Review organizing team (i.e., OAD, Capability Review Committee Chair, and POC) maintains contact during this step and consults if issues arise.
7. Participates in developing the Capability Review meeting agenda with the OAD and Capability Review Committee Chair.
8. Attends the Capability Review Chairs meeting hosted by the PADSTE before the review cycle starts.
9. Attends the Capability Review meeting as an ex-officio member, participates as a full member, including attendance at executive sessions, but does not participate in drafting the report.

LANL Organizing Associate Director (OAD)

1. Coordinates with LANL Director/PADSTE and with ADs who contribute to the capability to develop the Capability Review scope.
2. Works with the POC to prioritize the list of potential Capability Review Committee Chairs and members. The list is given to the PADSTE and the STC Chair for approval.
3. The OAD or POC, as appropriate, contacts the recommended Capability Review Committee Chair to ask if the person will serve; the PADSTE officially invites the Chair.
4. Reviews the prioritized Capability Review Committee membership candidate list with the selected Capability Review Committee chair and POC; the STC Chair and PADSTE are notified of any changes.
5. Works with the Capability Review Committee Chair and POC to identify potential dates for the Capability Review meeting.
6. With dates in hand, the OAD, POC, or Capability Review Committee Chair, as appropriate, contacts the proposed Capability Review Committee members regarding their willingness to serve until approximately 9 members, including the Chair, are enlisted. At least one and a maximum of two LLNL staff members and at least one University of California faculty member are to be named to each Capability Review Committee. The Capability Review organizing team (i.e., OAD,

Capability Review Committee Chair, and POC) maintains contact during this step and consults if issues arise.
7. Participates in developing the review agenda with the POC and Capability Review Committee Chair.
8. Identifies Los Alamos Laboratory Directed Research and Development (LDRD) project to be reviewed for the current year. The LANL LDRD Office can assist in project identification.
9. Attends the Capability Review Chairs meeting hosted by the PADSTE before the review cycle starts.
10. Compiles and sends background information to the Capability Review Committee before the review.
11. Provides logistics for the Capability Review meeting, including meeting rooms, necessary security for classified sessions, etc.
12. Works with the Capability Review Committee Chair to maintain review agenda and schedule.
13. Provides additional information requested by the Capability Review Committee.
14. Addresses Capability Review recommendations assigned by Director/PADSTE.

Capability Review Committee Chairperson

1. Reviews the prioritized Capability Review Committee membership candidate list with the selected OAD and POC; the STC Chair and PADSTE are notified of any changes.
2. Works with the organizing AD and POC to identify potential dates for the Capability Review meeting.
3. With dates in hand, the OAD, POC, or Capability Review Committee Chair, as appropriate, contacts the proposed Capability Review Committee members regarding their willingness to serve until approximately 9 members, including the Chair, are enlisted. At least one and a maximum of two LLNL staff members and at least one University of California faculty member are to be named to each Capability Review Committee. The Capability Review organizing team (i.e., OAD, Capability Review Committee Chair, and POC) maintains contact during this step and consults if issues arise.
4. Participates in developing the Capability Review meeting agenda with the POC and OAD. The Chair ensures sufficient executive time in the agenda for committee discussions.
5. Attends a meeting of the Capability Review Committee Chairs hosted by the PADSTE before the review cycle starts.
6. Distributes information about the meeting to Capability Review Committee members as necessary.
7. Presides over the review by keeping to the agenda, managing deliberations of the Capability Review Committee, and assigning tasks to Capability Review Committee members as appropriate.
8. Prepares and leads executive out-brief to the Director/PADSTE.
9. Provides Capability Review report to the LANL Director/PADSTE within 30 days of the review.

Capability Review Committee Members

1. Attend review and complete tasks assigned by Capability Review Committee Chair.
2. Provide unbiased and objective evaluation of the topics within the capability being assessed.
3. Provide written material to Capability Review Committee Chair with sufficient time to meet schedule.

Assessment

The evaluation of designated topics must address the following two criteria:

1) Comparison to peers -- State how the work compares to similar or related work conducted by others.
2) Sustainability -- State the extent to which the reviewed activities strengthen or weaken LANL capabilities. How does the activity/contribution build core competencies or other resources that contribute to the vitality of the capability and the long-term vigor of the Laboratory and its ability to meet the needs of the nation?

Laboratory Directed Research and Development Assessments for FY 2010 Capability Reviews

The Director/PADSTE will charge each Capability Review Committee to assess a single Laboratory Directed Research and Development (LDRD) project related to the capability. Many of the LDRD projects will be in their first year so the Capability Review Committee will be able to provide guidance on both the STE and the programmatic development of the project.

The Capability Review Committee is requested to prepare a one-half to one page assessment of the LDRD project that will be included in the Capability Review report and in the LDRD Annual Report to the DOE. The selected LDRD project will be included in the agenda as a presentation, and the Capability Review Committee will be asked to assess the project using the following criteria:

1. Performance: Is the project making good progress against its first year milestones? Has the PI assembled the appropriate team, collaborators, and facilities? Is the project plan re-assessed on a regular basis, in the light of new opportunities and unanticipated difficulties, to maximize the project's impact at the end of 3 years?
2. Quality: Are the initial S&T results of high quality compared to national and international peers? If the project is past its first year, then are project participants publishing in the archival literature and prestigious conferences?
3. Relevance: How do the project goals relate to the strategic directions of the Laboratory? Have the PI and program development mentor (PDM) developed a

transition plan, mapping out the project's future S&T direction after the LDRD funding concludes? Have the first steps of the transition plan been taken?

The Capability Review Committee's advice on future directions for the project is requested.

Briefing management

At the end of its meeting, the Capability Review Committee will brief its findings to LANL Management. Attendance at this briefing, other than senior management (Director/PADSTE), remains at the discretion of the Capability Review Committee Chair and the Director/PADSTE. The out-brief should provide executive style highlights of the assessments and advice for the capability. The Capability Review Committee should prioritize its assessment and advice for the out-briefing (and the report). Specifically, the Capability Review Committee should deliberate in its executive session to identify and prepare for presentation:

1) 3 to 7 most notable contributions observed in the review, and
2) 3 to 7 most important "actionable" recommendations.

Each of these components of the out-briefing should be presented in order of decreasing importance or significance (highest, next to highest, etc.). The rationale behind prioritization is to engage the wisdom and experience of the Capability Review Committee to identify the true pinnacles and the most significant challenges. It is the distinctiveness of the greatest achievements and the magnitude of the greatest challenges that characterize the excellence of an organization/program.

By prioritizing a limited number of items, Capability Review Committees are able to focus their feedback and enable meaningful follow up by LANL Management. A template containing recommended content for the out-briefing can be found in the Appendix of this document.

Preparing the Capability Review report

The Capability Review Committee must submit its assessment and advice via written report. The final copy is due to the Program Manager in the Science and Technology Based Programs Peer Review and Metrics Office within 30 working days of the end of the Capability Review meeting. The Capability Review Committee Chair is responsible for delegating writing assignments, coordinating inputs, editing the final document, and submitting it.

A suggested report template can be found in the Appendix of this document. The template includes abstracts of the areas to be assessed and headings delineating the areas in which specific advice has been requested. The assessment of the LDRD project can follow the same format, but the three criteria (performance, quality, and relevance) that were identified in these instructions need to be addressed.

Appendix

Capability Review Out-Brief Template

Acknowledgement and Recognition

Opening remarks
Feedback on execution of review

Prioritized Conclusions

Assessment of topics in the agenda
Top 3 to 7 Capability Review Committee "actionable" recommendations
Top 3 to 7 most notable science, technology and engineering contributions

Special topics

Any needs for additional information or meetings
Topics of enduring interest beyond the annual review cycle (e.g. from prior reviews)
Improvements in Capability Review Committee process

Capability Review Committee Report Template

Title
Table of Contents
Executive Summary
Introduction
Assessment
- Review Elements (*directly from agenda)*
  - Review element 1
    - Scope of the review
      - *Can use pre-written element description (single 50-300 word abstract written by LANL contributor summarizing goal of contribution, and key results)*
    - Analysis (consider using *one or more of these 4 facets)*
      - Approach
      - Implementation
      - Results
      - Impact of work
    - Assessment
      - Comparison to peers
      - Sustainability
  - Review element 2
  - Review element n

Assessment for LDRD Project …
- Performance:
- Quality
- Relevance

Recommendations
- Reply to Director's/PADSTE's requests

Prioritized Conclusions
- Top 3 to 7 most notable science, technology and engineering contributions (or other high performance indicators)
- Top 3 to 7 Capability Review Committee "actionable" recommendations

Acknowledgements
Appendices
- Capability Review Committee Meeting Agenda
- Roster of Capability Review Committee Members
- Additional inputs or documents used in assessment by Capability Review Committee

NPAC Strategic Capability Planning

Nuclear, Particle, Astrophysics and Cosmology (NPAC) Capability Review
14-16 April 2010

Joe Carlson , Theoretical Div NPAC Group
Don Rej, LANL Office of Science Programs
Tom Vestrand, Global Security Programs
Scott Wilburn, Physics Division Subatomic Physics Group

Objective of This Study

- Propose a strategy with findings, recommendations, and priorities for a balanced, high-quality, relevant, and sustainable NPAC capability at LANL.
  - To be proposed by a committee comprised of three technical leaders from TSC, GS, EPS, chosen and commissioned by Alan Bishop & Susan Seestrom
    - J. Carlson (T-2)
    - T. Vestrand (GS-PO)
    - S. Wilburn (P-25)
      - D. Rej (SPO-SC, Committee Chair)

Summary: This Study Resulted in 11 Recommended Strategic Goals in 4 Areas

- Project Execution
  1. Deliver on current obligations & transitions to new efforts
  2. Integrate cross-disciplinary computational astrophysics & cosmology projects into a high-visibility, sustainable Center
- Planning
  3. Plan, promote, & establish the next major thrust following current commitments on RHIC
  4. Develop & execute a decadal & beyond strategy for enabling LANL-led Space Mission in High Energy Astrophysics
  5. Develop & implement integrated staffing plans
- Relationships
  6. Form a strategic partnership with Fermilab
  7. Improve the correlation between community relevance, sponsor alignment, and stakeholder management
  8. Promote LANL's growing astrophysics & cosmology portfolio to DOE -SC
- Program Development
  9. Plan, attract community support, & market a world-class, intermediate-scale nuclear physics facility at LANL
  10. Support the strongest integrated experimental and theoretical prospects with DOE OHEP (Mini-CLEAN through G2 experiment selection)
  11. Support the strongest astrophysics program that produces impact science, significant programmatic contributions, *and* fosters & demonstrates major capabilities (Astroinformatics)

Outline

- Objective of this Exercise
- Planning Committee Charge
- Process
- Background Materials Examined
- Evaluation Criteria
- Findings
- Comments
- Recommendations

Committee Charge from ADEPS & ADTSC

- Deliverable:
  - Proposed strategy to Alan Bishop and Susan Seestrom, with findings, recommendations, and priorities for a balanced, high-quality, relevant, and sustainable NPAC capability at LANL.
- Recommendations to be based on following guidance & assumptions
  - No increases in current LDRD-DR NPAC investments
    - Also consider a reduced investment scenario (by one DR Project)
  - Realistic external sponsors budgets, plans, and interests

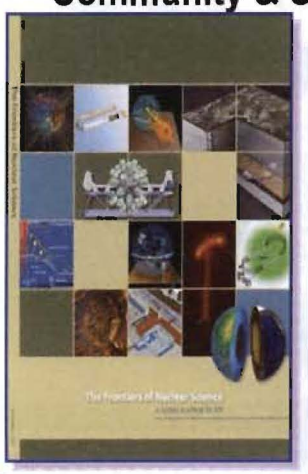
Committee Charge from ADEPS & ADTSC

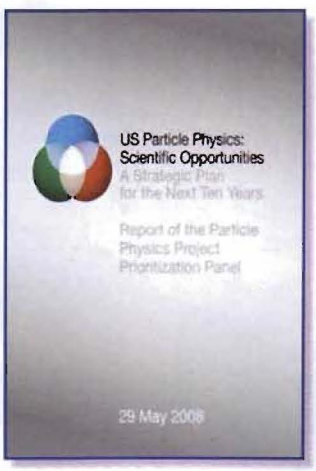
- Recommendations to be based on following prioritization criteria:
  - Relevance to LANL Mission
  - Relevance to National community strategies
  - Alignment with sponsors' interests and plans
    - Include SC, NASA, NSF
    - Consider LANL's reputation with particular sponsors, based on quality, relevance and performance, to date
  - Credible transition plans when taking on new NPAC scope
  - Leveraging opportunities
    - *e.g.,* ability to fold in matching funding from elsewhere
  - Sustainability
    - Ability to rapidly and effectively communicate importance of the NPAC portfolio to variety of changing stakeholders
      - *e.g.,* during management transitions

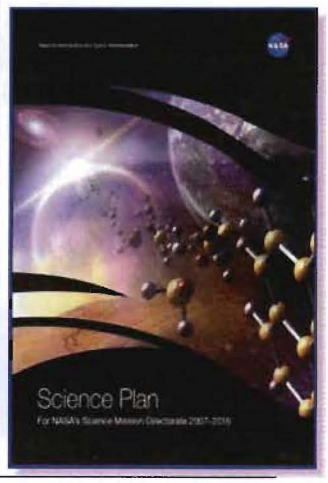
Thrusts & Capabilities Examined

- Accelerator Neutrinos
- -dot
- Astroinfomatics (*e.g.,* SkyDOT)
- Astrophysics Theory
- CLEAN
- Computational Cosmology
- FNPB Neutron Nuclear Phys
- FRIB Technology R&D
- -ray/ Neutron Detection for National Security
- HAWC
- Heavy Ions at CERN
- Heavy Ions at RHIC
- High Energy Physics Theory
- High-Energy Astrophysics (*e.g.,* Swift, GLAST)
- Isotope Production
- JDEM
- Low-E Neutrinos
- LSST
- Muon Tomography
- New Technology for Fast Access to Space (*e.g.,* microsats)
- NIF Nuclear Diagnostics
- Non-FRIB Isotope R&D
- NTS Archiving
- Nuclear Astrophysics Experiment (LANSCE & FRIB)
- Nuclear Physics Theory
- Nuclear Structure & Reactions & Nuclear Data (Theory & Experiment)
- Nucleon Spin & Medium E
- NW Design
- NW Radiochemistry
- Plasma Astrophysics
- Proton Interrogation
- Proton Radiography
- Radio/mm Astronomy (*e.g.,* LOFAR)
- Sub-Critical Materials Testing
- Sub-Orbital Technology
- Theoretical Particle Astrophysics & Cosmology
- Thinking Telescopes Technology
- Ultra Cold Neutrons

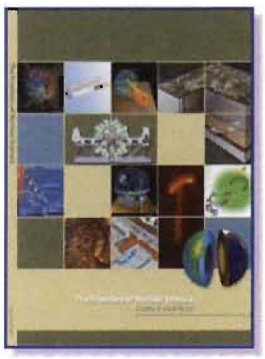
Background Materials Considered: Community & Sponsor Plans





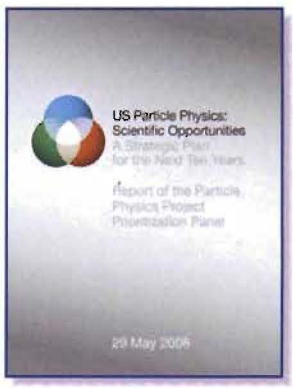


Recommendations from the NSAC Long-Range Plan (Dec. 2007)



- Complete the 12 GeV CEBAF Upgrade
- Construct he Facility for Rare Isotope Beams (FRIB)
- A targeted program of experiments to investigate neutrino properties and fundamental symmetries.
  - Construction of a DUSEL is vital to U.S. leadership in core aspects of this initiative.
- Implementation of the RHIC II luminosity upgrade & detector improvements
  - to determine properties of quark-gluon plasmas
- Initiatives meriting special consideration
  - Nuclear Theory
  - Accelerator R&D
  - Gamma-Ray Tracking

Recommendations from the HEPAP "P5" Report



- The Energy Frontier
  - Continue support Tevatron Collider program.
  - Support US LHC program
  - Broad accelerator & detector R&D for lepton colliders
- The Intensity Frontier
  - World-class neutrino program as a core component of US program, with long-term vision of a large detector in the proposed DUSEL and a high-intensity neutrino source at Fermilab.
  - DOE & NSF work together to realize a particle physics program at DUSEL.
  - Measurements of rare processes, to an extent depending on the funding levels available
- The Cosmic Frontier
  - Study of dark matter & dark energy as an integral part of the US particle physics program
  - DOE support the space-based JDEM, in collaboration with NASA
  - DOE support for the ground-based LSST program in coordination with NSF
  - Joint NSF & DOE support for direct dark matter search experiments
  - Limited R&D funding for other particle astrophysics projects & recommends establishing a PASAG

NASA Decadal Plan for Astrophysics: Objectives & Targeted Outcomes through 2016

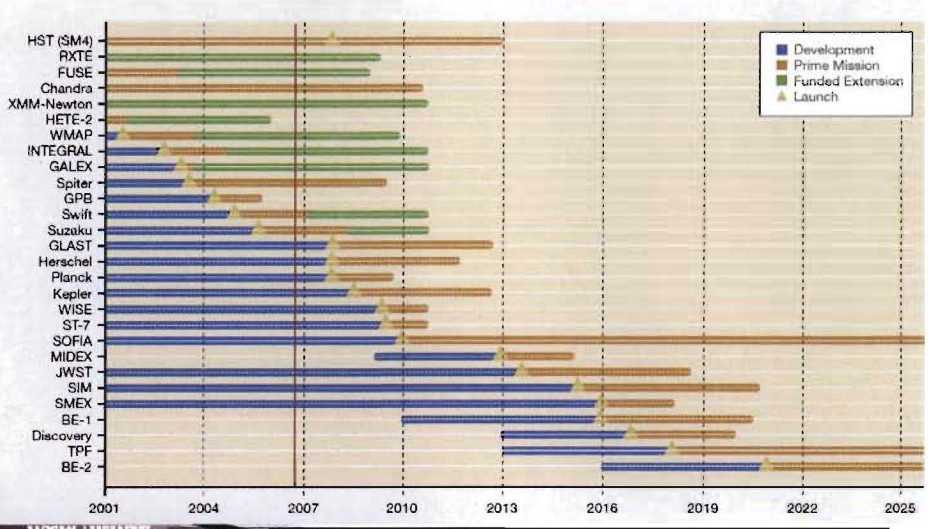
What are the Origin, Evolution, and Fate of the Universe?	How Do Planets, Stars, Galaxies, and Cosmic Structures Come into Being?	When and How Did the Elements of Life and the Universe Arise?	Is There Life Elsewhere?
Test the validity of Einstein's General Theory of Relativity. Investigate the nature of spacetime through tests of fundamental symmetries (e.g., is the speed of light truly a constant?). Test the inflation hypothesis of the Big Bang. Precisely determine the cosmological parameters governing the evolution of the universe. Improve our knowledge of dark energy, the mysterious cosmic energy that will determine the fate of the universe.	Investigate the seeds of cosmic structure in the cosmic microwave background. Measure the distribution of dark matter in the universe. Trace the filamentary cosmic web of atomic matter in the universe. Discover the first stars, galaxies, and quasars (black holes). Determine the mechanism(s) by which most of the matter of the universe became ionized. Determine the history of cosmic star formation and the assembly of galaxies. Study the birth of stellar and planetary systems. Uncover the connection between galaxies and supermassive black holes.	Discover when complex organic molecules, the precursors of biology, first appeared in the universe. Measure the metal enrichment of the diffuse intergalactic and interstellar media. Improve our understanding of supernovae and their nucleosynthesis of heavy elements needed for life.	Determine the frequency with which planets are found within the habitable zones of other stars and characterize their physical properties, such as mass, diameter and orbital parameters. Determine what properties of a star (such as metallicity) are most strongly correlated with the presence of habitable Earth-like planets.

NASA Decadal Plan for Astrophysics: Future Mission Summary

Program	Mission	Objective (See Table 2.1)				Mission Objectives and Features
		1	2	3	4	
Flagship	James Webb Space Telescope (JWST)	•	•	•	•	Infrared successor to the HST; 6.5 meter telescope with four infrared instruments at L2; partnership between NASA, the European Space Agency (ESA), and the Canadian Space Agency.
Flagship	Hubble Space Telescope – Servicing Mission 4 (HST SM4)	•	•	•	•	Enhance Hubble's range and dramatically increase both the survey power and the spectroscopic science capabilities. Space Shuttle servicing to add two instruments: Cosmic Origins Spectrograph operating at near ultraviolet wavelengths and Wide Field Camera 3 (WFC3) operating at near infrared wavelengths.
Strategic mission	Gamma-ray Large Area Space Telescope (GLAST)	•	•	•		Observations of celestial high energy gamma-ray sources. Joint NASA/DOE mission with a large area telescope for an all sky survey in the highest energy gamma rays.
SMC	Herschel Space Observatory			•	•	Completes (near the peak of the spectrum of galaxies) the long wavelength gap between JWST and Spitzer. ESA mission with NASA contribution.
EDC	Planck Surveyor	•				The third generation space mission to measure the anisotropy of the cosmic microwave background radiation. An ESA mission with major contributions from NASA.
Discovery	Kepler				•	Monitor 100,000 stars continuously for four years to detect Earth-sized planets using transit photometry. Discovery PI-led mission, sensitive detectors capable of detecting a change in a star's bright ness as small as 20 parts per million.
Explorer	Wide-field Infrared Survey Explorer (WISE)			•	•	Survey the whole sky in four mid-infrared bands to sensitivities 500 or more times better than prior mid-IR sky surveys. The survey will provide an important catalog for JWST. Explorer MIDEX PI-led mission, all-sky telescope (orbit/orbit), scanning spacecraft with scan mirror to freeze image on arrays for 4.6 second exposures.
Flagship	Stratospheric Observatory for Infrared Astronomy (SOFIA)			•	•	Infrared and submillimeter observations of stellar and planet-forming environments. Joint NASA/DLR (Germany) airborne 2.5-meter telescope on a Boeing 747; nine first-generation instruments.
Explorer	Explorer (MIDEX)	o	o	o		Competitively selected PI mission; could address any of the first three objectives.
Explorer	Explorer (SMEX)	o	o	o		Competitively selected PI mission; could address any of the first three objectives.

Program	Mission	Objective (See Table 2.1)				Mission Objectives and Features
		1	2	3	4	
Navigator	Space Interferometry Mission (SIM)		•	•	•	Detect and characterize other planetary systems; measure the mass of planets and stars; measure the internal dynamics and external motions of galaxies in the Local Group and beyond; investigate quasar physics and establish the successor to the International Celestial Reference Frame. A 9-m baseline interferometer in Earth-trailing solar orbit.
(E)	Constellation-X (Con-X)	•	•	•		X-ray imaging and spectroscopy for the study of black holes, dark matter, dark energy and neutron stars. Single spacecraft carrying a constellation of four telescopes placed in an L2 orbit with a combined collecting area of 1.3 square meters.
(E)	Joint Dark Energy Mission (JDEM)	•				Measure the cosmological parameters of the expanding Universe. Joint NASA/DOE mission. Three mission concept studies (ADEPT, DESTINY, SNAP) have been selected by NASA to examine differing mission implementations.
(E)	Laser Interferometry Space Antenna (LISA)	•	•	•		First measurement of low-frequency gravitational waves. Three independent, free-flying, drag-free spacecraft periods for three-arm interferometry of a variety of astrophysical sources. Collaboration with ESA.
(E)	Black Hole Finder Probe (BHFP)	•				Conduct a thorough census of black holes in the universe.
(E)	Inflation Probe (IP)	•				Provide a stringent test of inflationary cosmology, the physics of the universe at less than a trillionth of a second after the Big Bang. This is a PI-class mission that will be selected by competition.
Navigator	Terrestrial Planet Finder – Interferometer (TPF)		•	•	•	Interferometer - Detect and characterize all components of other planetary systems, including terrestrial planets, gas giant planets, asteroid belts; search for signs of life in terrestrial planets. Four 3 x 4 m passively cooled telescopes on separate formation flying spacecraft feeding light to a rotating interferometer on a fifth spacecraft. Proposed joint project with ESA's Darwin mission. Coronagraph - Image Earth-like planets, giant planets, and zodiacal dust around nearby stars; search for signs of life on Earth-like planets; carry out general astrophysics observations probing dark energy and dark matter. Single telescope at L2 with a narrow field coronagraph and spectrometer to observe planets 10^{-10} as bright as their stars, and a wide-field camera for general astrophysics in the visible and near-infrared.

NASA Decadal Plan for Astrophysics: Timeline of Missions



Projects at the Cosmic Frontier naturally exist at boundary between particle physics & astrophysics

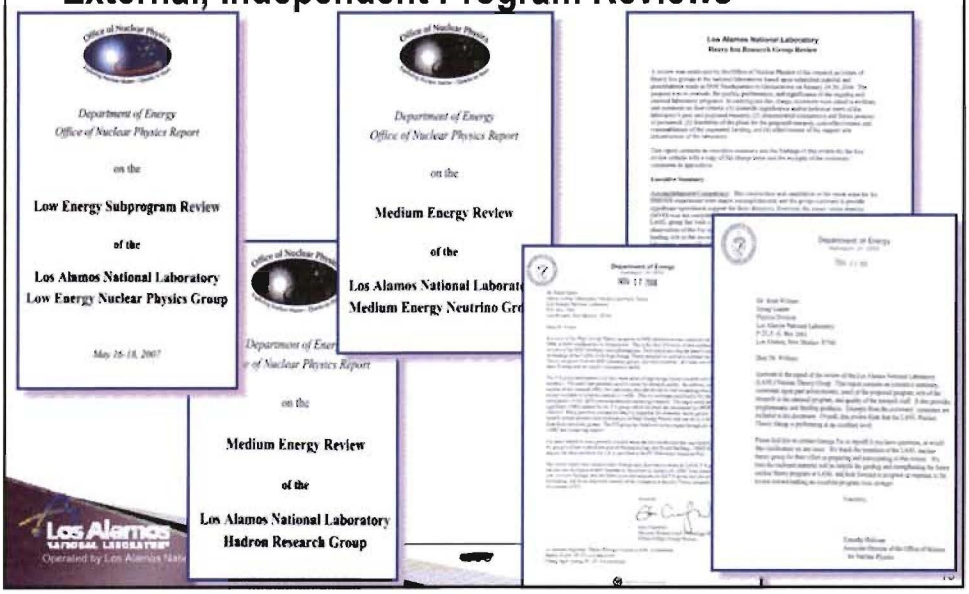
- HEPAP chartered a PASAG to assess:
  - Dark matter
  - Dark energy
  - Cosmic particles (high-energy cosmic rays, gamma rays, neutrinos)
  - Cosmic microwave background
- Recommendations for most pessimistic budget scenario (FY08 level w/3.5% annual escalation) include:
  - Dark matter
    - Two G2 experiments and the 100-kg SuperCDMS-SNOLAB experiment
    - Technology selection for the G2 experiments should occur soon enough to allow the construction of at least one G2 experiment to start as early as FY13.
    - No G3 experiments can be started in this decade. Progress will be slowed, risking loss of U.S. world leadership. However, due to the risk of picking the wrong technology, this is preferable to descoping to only one G2 experiment.
  - High-energy cosmic particles
    - Only VERITAS upgrade and HAWC are possible.
    - Even in this very lean scenario, the diversity offered by these two projects is a priority, and their impacts are large for a relatively small investment.
    - Auger North and AGIS are not possible.
      - This would be a retreat from U.S. leadership in high-energy cosmic rays and high-energy gamma rays.

Report of the HEPAP Particle Astrophysics Scientific Assessment Group (PASAG)

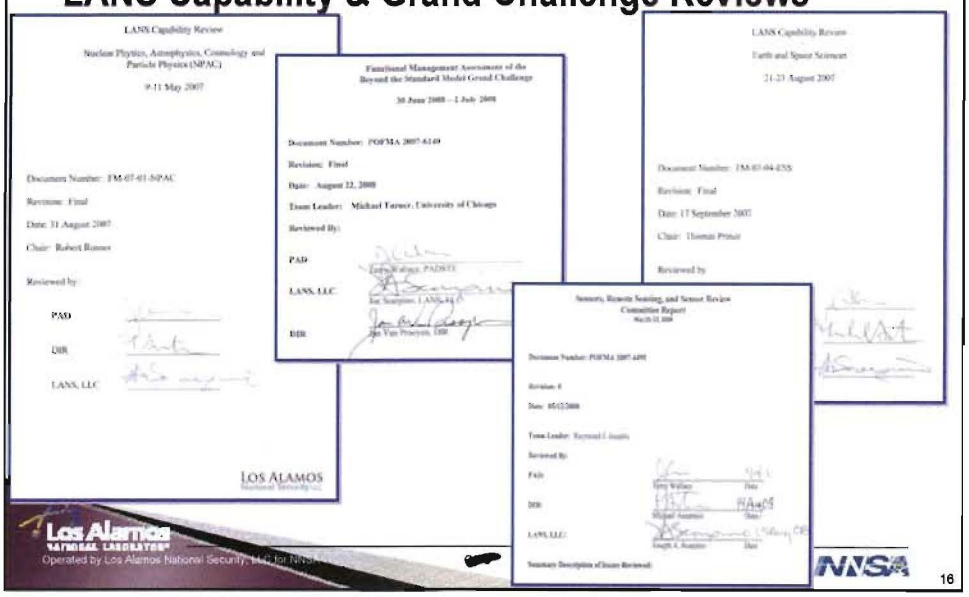
20 October 2009

DRAFT v1.12a

Background Materials Considered: External, Independent Program Reviews



Background Materials Considered: External LANS Capability & Grand Challenge Reviews



Recommendations from the Rosner Report

- "Hard decisions will need to be made soon
  - ambitions exceed funding projections
  - buy-in' from the troops is essential."
- "A sustainable & stable funding plan for basic research aligned with the Lab's mission needs to be found & implemented."
- "Needs to formulate an implementation plan for the BSM Grand Challenge in a timely manner
  - e.g., winnow down to the program that matches the Lab's mission and is financially sustainable."
- "Lab needs to make the difficult choices on which (Astrophysics & Cosmology) projects to pursue, commensurate with the core competencies, synergy with Lab Mission, and ability to sustain."


LANS Capability Review

Nuclear Physics, Astrophysics, Cosmology and Particle Physics (NPAC)

9-11 May 2007

Document Number: FM-07-01-NPAC

Revision: Final

Date: 31 August 2007

Chair: Robert Rosner

Reviewed by:

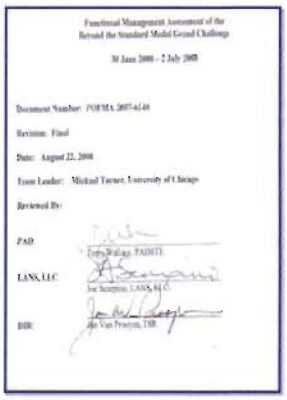
PAD

DIR

LANS, LLC

LOS ALAMOS

Excerpts from the Turner Report


Functional Management Assessment of the Beyond the Standard Model Grand Challenge

30 June 2008 - 2 July 2008

Document Number: FOFMA 2007-6149

Revision: Final

Date: August 22, 2008

Team Leader: Michael Turner, University of Chicago

Reviewed By:

PAD

LANS, LLC

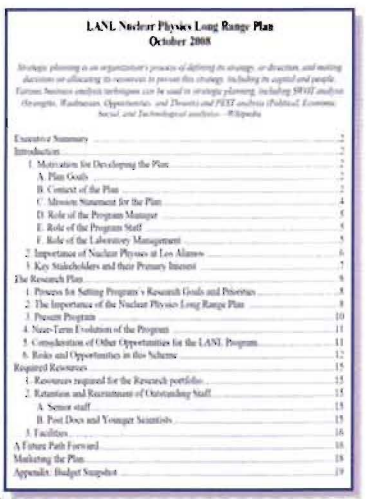
DIR

- Recommendations:
  - "Further refine BSM strategy & develop priorities, based upon quality of science, connection to programs, and match to the Lab's technical and human assets."
  - "Develop performance metrics that measure the success and progress of BSM GC (e.g., sustainable funding for projects, integration of young scientists into programs, scientific and technical milestones)."
  - "Opportunities exceed what can be realistically and effectively achieved; hard decisions will need to be made."
  - "Establish a mentoring program for young scientists to guide them into stable funding within Laboratory programs, or to move them onto other career paths."
- Comments:
  - "Since nearly half of the support for nuclear physics comes from LDRD, the BSM/GC is effectively determining the future direction of Nuclear Physics at the Lab. Given this reality, strategic decisions are realized through the BSM/GC and it is essential that there be a well formulated global strategic plan."
  - "The cosmology theme of the BSM/GC has a 3-prong strategy in place: direct dark matter detection; computational cosmology; dark energy surveys. This strategy is the most well developed of the BSM/GC strategies and is well matched to the Lab's assets (high-performance computing, strong experimental nuclear physics) and the most exciting scientific opportunities (e.g., dark matter and dark energy)."

Excerpts from the Prince Report

- "LANL's capabilities in space physics directly contribute to and are relevant to the mission of the Laboratory.
  - "LANL's capabilities in space physics are critically important for space-based nuclear detonation detection and non-proliferation treaty monitoring from space.
  - "LANL's capabilities in space physics provide a critically important and unique contribution to space situational awareness, a rapidly growing area in national security space; space situational awareness is specifically listed in the U.S. National Space Policy (2006)."

Background Materials Considered: Internal LANL Community Planning & Analysis



LANL Nuclear Physics Long Range Plan
October 2008

HEP - Activities, Funding and Opportunities
HEP National Priority Alignment (P5 Panel and Report):

Ongoing and Future Programs & Capabilities Examined With Respect to Eight Factors

Relevance & Significance to Mission, Community, & Sponsor

1. Relevance to LANL National Security Mission (*i.e.,* NW, Global Security, & Energy)
2. Relevance to National basic science community strategies
3. Alignment with sponsors' interests and plans

Reputation of People & Team with Sponsor & Community

4. LANL's reputation with particular sponsors, based on quality, relevance & performance to date
5. Talent Management

Sustainability of Effort: Leverage, Transition, Stakeholder breadth

6. Leveraging opportunities *(e.g.,* existing infrastructure, ability to fold in matching external funding from thrust sponsor)
7. Credible transition plans when taking on new NPAC scope
8. Ability to rapidly and effectively communicate importance of the NPAC portfolio to variety of changing stakeholders (*e.g.,* during management transitions).

Consideration 1:

Relevance to LANL National Security Mission

Low: Notional connections to LANL National Security Mission (*e.g.,* some capability overlap).

Moderate: 2-way communication

Connection identified, but not proven. Mission Program Mangers are engaged with PIs and their divisions; key team members knowledgeable of Mission programs.

High: 1-way personnel, idea, and technology transfer demonstrated

Technology and technique spin-offs, several former staff now leading major National Security thrusts.

Very High: 2-way personnel, idea, and technology transfer demonstrated

Strong, continued, and sustainable connections demonstrated: PIs and other key staff regularly contribute concurrently to a NPAC basic science thrust and National Security programs, regular and continuous transfers of innovation and technologies between programs. Peer reviewed publication in journals outside the principal field indicating broad impact.

Consideration 2:

Relevance to National Science Community Strategies

Low: Notional connections to community strategies and collaborations.

Moderate: Connection identified but not widely accepted

LANL thrust fits well within a leading strategy and is competitive, but strong community engagement and support not yet attained; strong collaborations with world-class organizations under discussion/negotiation .

High: Clear connections demonstrated

Priorities developed in major reports (*e.g.,* NAS level) include LANL thrust by name; staff asked to speak to Academy or equivalent panels to discuss further research directions; while competitive, significant results from LANL not yet realized; strong collaborations with world leading organizations and PIs formally established. Strong peer review comments in all relevant areas.

Very High: Strong, continued, and sustainable connections demonstrated

Priorities developed in major reports (*e.g.,* NAS level) cite specifics of LANL ideas by name; staff lead Academy or equivalent panels; this work changes or will likely change the direction of research fields; high impact LANL publications (in prestigious journals, high number of citations, important positive publicity); LANL is highly competitive and principals are the world leaders in the field; strong collaborations with world leading organizations and their PIs formally established; work changes the way the research community thinks about a particular field; team is recognized by the research community as the leader for making the science case for a new program/facility; resolves critical questions and thus moves research areas forward; results generate huge interest/enthusiasm in the field .

Consideration 3:

Alignment With Sponsors' Interests and Plans

None: External interest unlikely

LANL's return on investment is in fame, not fortune .

Low : Notional connections with sponsor's plans

Cognizant LANL program managers engaged

Moderate: Connection identified but not proven

Sponsor has been briefed, is engaged, and has provided positive feedback.

High: Clear connections demonstrated

Sponsor strategic plan priorities include thrust by name; LANL in a position to credibly compete for a significant role; significant results by LANL not yet realized; principal collaborators are already funded by sponsor; competition likely within 3 years; reviews repeatedly confirm potential for scientific discovery in areas that support the Department's mission, and potential to change a discipline or research area's direction.

Very High: Strong, continued, and sustainable connections demonstrated

Strong, continued, and sustainable connections demonstrated: Priorities articulated in sponsor strategic plan cite specifics of the LANL idea by name, with LANL indicated as playing a significant role; collaborators are already funded by sponsor; competition for major role likely within 3 years; new project teams identify, analyze and champion novel approaches for acquiring the new capability, including leveraging or extending the capability of existing facilities and financing; proposed approaches are widely regarded as innovative, novel, comprehensive, and potentially cost-effective.

Consideration 4:

LANL reputation with particular sponsors, based on quality, relevance & performance to date

None: Sponsor unaware of LANL, or has serious issues with LANL that must be confronted and resolved

A number of projects have not met expectations for quantity, schedule, &/or quality; peer reviews identify significant deficiencies that have negatively impacted overall program/project

Low: Sponsor is acquainted with LANL and has a mixed opinion

Most program/project goals and/or milestones are met on schedule and within budget; overall program/project and/or mission objective(s) are met; minor delays, overruns, and/or deficiencies are minimized and/or have little to no adverse impact the overall program/project.

Moderate: Sponsor views LANL as a credible player based on a history of previous work directly for sponsor

Key researchers are known by name and respected by sponsor; peer reviews are largely positive, with only a few minor deficiencies and/or slightly negative responses noted; minor deficiencies and/or negative responses have little to no potential to adversely impact the overall program/project; program/project goals and/or milestones are primarily met on schedule and within budget.

High: Sponsor fully satisfied with LANL previous performance and key personnel

as evidenced by peer reviews that are universally positive, sustained funding, and recognition; program/project and/or mission objective(s) are fully meet and are fully responsive to sponsor guidance; development of tools and techniques that become standards or widely-used in the scientific community.

Very High: Sponsor delighted with LANL previous performance and key personnel

as evidenced by best-in-class peer reviews, increased market share of funding, and awards. Sponsor and independent experts and/or peers laud work results; output(s) exceeds the amount and/or quality typically expected for an excellent body of work; program/project goals and/or milestones are met well ahead of schedule and/or well under budget; demonstrated willingness to take on high-risk/high payoff/long-term research problems *accompanied by* evidence that the team "guessed right" in that previous risky decisions proved to be correct and are paying off.

Consideration 5:

Talent Management

Low: Qualified staff in place but critical hires needed

Moderate: Thrust a proven attractor of qualified post docs and critical hires; quality staff retention and collaboration satisfactory.

Initial signs of success are evident.

High: Thrust is a recruitment magnet, as evidenced by many Director and Named Postdocs; mid-career award winners, and Lab Fellows who continue to contribute to intellectual leadership.

Strong performers in most areas; some aspects of programs are world-class; development and maintenance of strong core competencies that are cognizant of the need for both high-risk research and stewardship for mission-critical research; attracting and retaining scientific staff that are very talented in all programs .

Very High: Internationally-renown leadership

There are significant, major award winners in field); group is trend-setter in their field with invited talks, citations, making high-quality data available to the scientific community; attraction and retention of world-leading scientists; recognition within the community as a world leader in the field.

Consideration 6:

Leveraging opportunities *(e.g.,* ability to fold in matching external funding from thrust sponsor)

Low: Notional opportunities identified.

New LDRD-DR needed to initiate thrust and likely needed to extend beyond 3 years.

Moderate: Opportunity clearly identified.

New LDRD-DR needed to initiate thrust not likely to extend beyond 3 years.

High: Matching LDRD funds in hand and likely not needed after current LDRD project(s) ends.

Very High: Stable, matching (or greater) programmatic funds in hand.

May need LDRD-ER to expand or enhance capability breadth and depth.

Consideration 7:

Credible transition plans when taking on new scope

Low: Initial, notional planning evident.

Moderate: Key personnel staffing, facility, and infrastructure plans developed; over commitment and infrastructure/facility gaps identified.

High: Staffing, facility, and infrastructure plans for key personnel developed; plans in place to fill identified over commitment and infrastructure/facility gaps.

Very High: Staffing, facility, and infrastructure plans for key personnel developed; no major over commitment and infrastructure/facility gaps evident.

Consideration 8:

Ability to rapidly and effectively communicate importance of the NPAC portfolio to variety of changing stakeholders

Low: Notional connections. Need to collect and document thoughts.

Moderate: Compelling communication packages *e.g.,* white papers, brochures, briefings) for non-specialist decision makers written, distributed, and regularly communicated

High: Multiple stakeholders understand and support thrust, and capable of effectively representing thrust.

Very High: Multiple stakeholders serve as champions for the thrust, and regularly represent the thrust in presentations and documents. Thrust is an Institutional priority.

Findings: Nuclear Physics

Nuclear science, both basic & applied, continues to be one of our most important capabilities to ensure that we can reduce nuclear risk.

- Then:
  - LANL was founded to develop nuclear explosives. Its most notable founding scientists were world renowned nuclear physicists: Oppenheimer, Teller, Bethe, Dirac, and Fermi.
  - Strong interaction between our core mission and basic nuclear science resulted in the only Nobel Prize ever awarded for work at a weapons laboratory, the discovery of the neutrino.
- Now:
  - Nuclear physics has remained one of our most important core competencies to today, and the interaction between basic science and the core programs has demonstrated continued vitality.
  - Scientists from our basic science program have recently developed new techniques being used in the core weapons program such as proton radiography. They are providing important cross section measurements that are needed for mining the underground test data base.
  - LANSCE, which started as a nuclear science facility is now being used for many material science applications that are helping to steward the aging nuclear stockpile, and is the cornerstone for our next signature facility, MaRIE.
  - In addition to weapons applications, nuclear science techniques are contributing to other mission areas, including homeland security, for example: low field nuclear magnetic resonance imaging for high explosive detection, cosmic ray muon tomography for nuclear explosive detection, new techniques for active interrogation using muons and high energy protons, and improved radiation detection techniques.

Findings: Nuclear Physics
LANL nuclear physics program is of high quality

- Emphasis on neutrinos, fundamental symmetries, neutrino and nuclear astrophysics, nucleon spin, and the physics of the QGP. The first three have been raised in priority in the most recent Nuclear Physics Long-Range Plan.
- LANL is significantly involved in new high-profile experimental projects, *e.g.,* nEDM and Majorana.
- Project management reputation from our work on RHIC PHENIX FVTX is high.
- Theory program is strong, *and*
  - can be further strengthened by taking advantage of LANL facilities (*e.g.,* high-performance computing), and tying to Laboratory and DOE/NP national program priorities;
  - can provide an important connection to, and leverage for, theoretical particle and astrophysics initiatives.

Findings & Comments: Nuclear Physics
Top prospects for program development are off-site

- LANL-based facilities and experiments are not considered to be a high priority by ONP (and HEP) sponsors.
  - ➢ 12-GeV CEBAF Upgrade, FRIB, FNPB are top new ONP facility priorities.
  - ➢ Community support is likely needed to attract major external facility investments at LANL.

Comments: LANL should perform the best science at the best facilities; nevertheless, the lack of a significant local facility is not entirely healthy for LANL. Some expertise is necessarily tied to the facility host laboratory and is lost when only pursuing offsite experiments, as are integration opportunities with our National Security mission. While ONP terminated support of LAMPF operations in the 90's, they began supporting operations of the LANSCE IPF in 2009. There may be other opportunities to renew ONP stewardship of research facilities at LANSCE. It is unlikely that large-scale ONP experimental facilities could be hosted by LANL; however, there are intermediate-scale facilities at LANL worthy of a national lab, that could grow, *e.g.,* UCN, nuclear astrophysics, isotopes.

Findings & Comments: Nuclear Physics
Basic BSM & Applied program integration is uneven

There is close coupling between BSM physics and applied nuclear physics (*e.g.,* in NW, GS, NE) in some areas, and gaps in others.

- There is strong overlap between scientists working on fundamental neutron physics and pRad and GS activities.
- Development of large-area, state-of-the-art silicon detectors for ONP heavy ion experiments has proven to be an effective gateway for staffing Global Security Programs.
- Theoretical and experimental nuclear data programs provide crucial support to LANL National Security mission (*i.e.,* "deterrence by capability").

Comment: The gap between BSM physics and applied nuclear physics could be bridged by starting or enhancing a program aimed at FRIB nuclear structure/reactions, nuclear astrophysics, fundamental symmetries; however, present staffing level is insufficient to pursue a leading role at FRIB. While early career scientists at LANL are highly capable, there is a need for mid-career experimentalists who could lead such an effort.

Nuclear Physics: Recommendations & Comments

Comment: Experimental & theoretical nuclear physics is a critical part of many future directions for LANL and its health should be a top priority.

Recommendations:

1. Deliver on current obligations & transitions to new efforts

   Comments: Average program peer reviews result in status quo, while above-average program reviews are required for credible program development and portfolio growth. Construction projects (FVTX, nEDM,) are especially important and must to be managed with discipline and rigor. Special attention is needed for Majorana as it transitions from R&D to project phase & as mature experiments reach their conclusions.

2. Plan, promote, and establish the next major LANL thrust to follow the successful conclusion of our commitments on RHIC

   Comment: LHC and/or JLab are viewed as our most promising near-term prospects at this time. A leading role in the Electron-Ion Collider should be evaluated as a longer-term goal. Re-evaluate this position once the future of RHIC and the EIC become clear; we should position ourselves for a technical leadership role, and as neutral brokers that may inform facility decisions.

3. Make a concerted effort to plan, attract community support, market, and sell world-class, intermediate-scale National user facilities at LANL

   Comment: Targets of Opportunity include:(1) Expanding the IPF mission to provide isotopes to the research community; (2) utilizing UCN at full capacity; and (3) exploring potential of WNR to support National nuclear data community and FRIB physics. Reevaluate options and position after assessing community support and sponsor reaction to that support.

Findings: Particle Physics
Opportunities exist for new OHEP program starts

- For the first time in many years, LANL has significant prospects for increasing external OHEP support because of the close ties of the nuclear program with particle physics.
  - "The U.S. is uniquely positioned for a world-leading (HEP) program in neutrino physics" – W. Brinkman Feb. 1, 2010.
  - LANL experience at FNAL in neutrino physics has resulted in a unique opportunity to play an important role in future long-baseline experiments.
  - LANL reputation in HEP neutrino theory is high.
  - HEP environment will continue to be highly competitive.
- DEEP/CLEAN experiment is a strong candidate for OHEP support because of its ability to scale to large detector sizes at reasonable cost.
- LANL theoretical HEP program is subcritical, and found to be at risk if not corrected by the next DOE Theory review in 2011.
  - HEP theory peer reviews indicate a need to take advantage of national laboratory infrastructure (*e.g.,* high-performance computing, on-site collaborations with major experiments).

Comments: Particle Physics

- Our theoretical HEP program could be strengthened by
  - Playing a significant role in large-scale simulations, *e.g.,* those supported by DOE-SC-ASCR.
  - Connecting to the experimental programs in both nuclear and particle physics, and in cosmological grand challenges.
- Fermilab (FNAL) appears to be a natural HEP partner for LANL
  - FNAL is "OHEP's Lab."
  - Experiments are opening new opportunities in the interface between NP and HEP.
  - Grass roots collaborations have sprung up in AOT, ISR, MPA, P, T Divisions that provide nucleation sites for a longer-term, strategic partnership.
  - FNAL, particularly in conjunction with the DUSEL, currently has an abundance of outstanding scientific opportunities.
  - FNAL is actively seeking LANL contributions to their new OHEP initiatives.

Particle Physics: Recommendations & Comments

Recommendations:

1. Form a strategic partnership with Fermilab.

   Comments: There is an excellent opportunity to build upon success achieved by the LANL accelerator and theoretical neutrino groups. Being the FNAL strategic partner of choice would provide leverage to obtain increased DOE OHEP support and develop NPAC science in new directions.

2. Invest and support the strongest integrated experimental and theoretical prospects with DOE OHEP.

   Comments: The Mini-CLEAN Project is viewed as our most promising major experimental program development opportunity at this time, and worthy of full support as a top Institutional priority, up until the selection of the 2nd-Generation (G2) Experiment. Re-evaluate this position after first results from Mini-CLEAN are achieved and the G2 decision in FY13.

   A focused effort is needed to establish a sustainable theory program, integrated with LANL experiments.

Findings: Astrophysics & Cosmology

LANL's breadth touches most areas of this discipline

- Key threads running through many LANL thrusts are high-energy and nuclear processes, and cosmic explosions.
- LANL strengths include
  - Cross-disciplinary approaches and expertise (nuclear physics, astrophysics, equation of state physics, plasma physics, modeling and computing) provide a competitive advantage, *e.g.*, the new ONP Collaborative Center for Dense Matter & Neutrinos, and Laboratory expertise for measuring key nuclear cross-sections.
  - Measuring x-rays, gamma-rays, and neutrons both in space and on the ground
    - Storied history of space-based performance from VELA through SWIFT
    - New ground-based efforts at the proposed HAWC Observatory are now being supported, following strong endorsements from the NSF/DOE-SC HEPAP PA-SAG.
  - Distributed robotic instrumentation, real-time knowledge extraction, data mining, and the curation of peta-scale datasets.
    - Application of this capability to both open science and Global Security problems like Space Situation Awareness is important and a rapidly growing thrust across the laboratory.
- Programmatic & science mission relevance continues to be high
  - LANL Weapons Program established an Astrophysics Center in 2000 that co-located X & T Div personnel, hired postdocs, and provided a recruiting portal. Center was disbanded in 2004 after ASC funding cuts.
    - There has been renewed NNSA interest in establishing an Astrophysics Center in recent years to provide a recruiting portal.
  - Programmatic and science mission relevance of astro-informatics is high and traction is rapidly growing.
    - Other major research institutions are copying LANL.
  - ASCR/HEP extreme scale computing panel lists large-scale structure simulations as an HEP priority.

Findings: Astrophysics & Cosmology
Our NASA reputation has been consistently high, but..

- Swift, the Lunar/Mars missions, & Space Environment IBEX missions all 1st-rate
- There is much commonality in LANL interests and future NASA missions
  - LANL Director offered to visit NASA to promote & partner at executive level
- LANL's significant space expertise is recognized by NASA and the programmatic side of DOE, *but:*
  - LANL's decades of experience do not appear to be fully appreciated by DOE-SC, who in the future may be embarking on serious investments in a space-based dark energy mission.
  - Given the limited available funds, SC has supported their currently funded particle physicists, before funding scientists at NNSA Labs with space experience.
- There appear to be insufficient investments to position LANL for sustained leadership with NASA.

Comments: Astrophysics & Cosmology

- Current programmatic capability needs and discovery science opportunities warrant re-examination of a viable Computational Astrophysics & Cosmology Center at LANL, building upon the lessons learned & best practices from previous attempts.
- Depth and breadth of theory and experimental and observational capability for the study of extreme astrophysical environments is one the scientific "crown jewels" at LANL. We need to develop a plan for astrophysics at LANL that integrates tailored strategies for the primary customers --- NASA, NNSA, & SC.
- Efforts like the Astroinformatics Signature Facility is a natural way to both demonstrate and to grow the distributed robotic instrumentation, real-time knowledge extraction, data mining, and curation of peta-scale datasets capability.
- While our reputation at NASA is high, we must position ourselves for sustained leadership by investing in development of new space instrumentation, technologies, and PIs. Sub-orbital payloads and mini/micro-satellites are an excellent means to grow new leaders and new test new technologies.

Astrophysics & Cosmology: Recommendations & Comments

Recommendations:

1. Successfully execute externally-sponsored and LDRD programs that exercise cross-disciplinary computational capabilities needed for astrophysics and cosmology. Integrate these efforts into a single high-visibility, sustainable Center where the whole is greater than the sum of the parts, making strong contributions to both programmatic and basic science work, and with strong connections to leading experiments and observations.

   Comments: Objectives of a Center could include: (1) maintaining a sustainable world-class capability; (2) demonstrating strong "push" from NNSA, SC, NASA, and other programs; (3) effectively exploiting LANL's cross disciplinary strengths (people and infrastructure); (4) promoting strong, daily communication and career mobility between programmatic and discovery science researchers, including established intellectual leaders and early career staff; (5) serving as a recruiting portal; (6) developing & executing the overall LANL strategy for Computational Astrophysics & Cosmology.

   In addition to programmatic work scope, sustainability would be enhanced by strategic collaborations with major discovery science experimental facilities such LIGO, FRIB, DUSEL Observatories, LSST, and the JDEM Great surveys, where a Computational Center supports both the mission design and interpretation of observations.

2. Support the strongest program that: (1) produces marquee impact science; *and* (2) make significant programmatic contributions; *and* (3) fosters & demonstrates major LANL capabilities.

   Comment: Astroinformatics is viewed as our most promising experimental program development opportunity at this time; it exploits LANL's considerable strengths in information science, real-time knowledge extraction, computation, and robotic instrumentation.

3. Promote LANL's growing astrophysics & cosmology portfolio to DOE -SC.

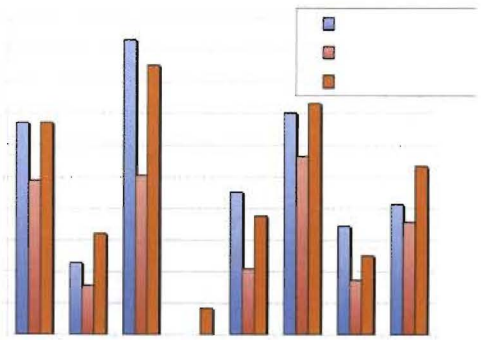
   Comment: Recent PASAG endorsement of HAWC is an excellent first step.

4. Develop & execute a LANL decadal & beyond strategy for enabling a DOE-NNSA programmatic, DOE -SC and NASA partnership to conduct a LANL-led Space Mission in High Energy Astrophysics.

   Comment: Current theoretical & computational efforts, such as cosmic explosions and nuclear astrophysics, and experimental efforts, such as CPE, should drive this effort.

General Findings:

- LDRD investments are critical to develop sustained programs on the NPAC frontier
  - FVTX, nEDM, UCN
  - SciDAC
  - Space Situation Awareness
- Staffing levels for projects are often subcritical
  - "Ambitions exceed funding projections"
  - Limited planning for timely staffing when taking on new work, while delivering on existing program obligations
- Operational barriers present a vulnerability for sustainable program
  - Is science productivity considered when making operational decisions, e.g., scientific computing, Foreign National access?



LDRD investments in the Beyond the Standard Model Grand Challenge have been significant, corresponding to ~ 10% of total portfolio

General Comments

- We are pursuing many opportunities at DOE-SC right now; this is a sign of a healthy program and the right approach, *but:*
  - We must realize that many of the new initiatives ultimately will not prove successful;
  - LANL must be prepared to cut off projects which will not be supported by DOE/SC or other agencies.
- Waiting for funding to arrive before developing a staffing plan results in substantial project schedule risks.
  - Failing on early project deliverables adversely affects reputation, relationships, momentum, and productivity.
  - Consider best practices and lessons learned from LANL BES programs.
- All strategic programs should be forward looking, with regular self-assessments, and investments to refresh, as needed.

General Recommendations & Comments

Recommendations:

1. Improve the correlation between community relevance, sponsor alignment, and stakeholder management.

   Comments: Stakeholders should be aware of and able to champion programs. In cases where community relevance exceeds sponsor alignment, work with the scientific community through planning documents, publications, and peer review to enhance sponsor alignment. In cases where sponsor alignment is high, use this political capital to pursue the highest-quality science in that research area.

2. Develop and implement integrated staffing plans for existing and proposed thrusts

   Comments: A staffing plan for each existing and proposed project (FTE numbers, names, and schedule) that documents needs, personnel gaps, recruiting priorities, and partnering preferences. Working without these plans or on an *ad-hoc* basis threatens our ability to deliver on commitments.

Summary: This Study Resulted in 11 Recommended Strategic Goals in 4 Areas

- Project Execution
  1. Deliver on current obligations & transitions to new efforts
  2. Integrate cross-disciplinary computational astrophysics & cosmology projects into a high-visibility, sustainable Center
- Planning
  3. Plan, promote, & establish the next major thrust following current commitments on RHIC
  4. Develop & execute a decadal & beyond strategy for enabling LANL-led Space Mission in High Energy Astrophysics
  5. Develop & implement integrated staffing plans
- Relationships
  6. Form a strategic partnership with Fermilab
  7. Improve the correlation between community relevance, sponsor alignment, and stakeholder management
  8. Promote LANL's growing astrophysics & cosmology portfolio to DOE -SC
- Program Development
  9. Plan, attract community support, & market a world-class, intermediate-scale nuclear physics facility at LANL
  10. Support the strongest integrated experimental and theoretical prospects with DOE OHEP (Mini-CLEAN through G2 experiment selection)
  11. Support the strongest astrophysics program that produces impact science, significant programmatic contributions, *and* fosters & demonstrates major capabilities (Astroinformatics)

Summary self-assessment for the Nuclear and Particle Physics, Astrophysics and Cosmology (NPAC) Capability Review 14-16 April 2010

Introduction

The present document represents a summary self-assessment of the status of the NPAC capability across Los Alamos National Laboratory. For the purpose of the review we have divided the capability into four theme areas: Nuclear Physics, Particle Physics, Astrophysics and Cosmology, and Applied Physics. For each theme area we have tried to give a general but brief description of the activities under the area, a list of the Laboratory divisions involved in the work, connections to the goals and mission of the Laboratory, a brief description of progress over the last three years[1], our opinion of the overall status of the theme area and challenges and issues.

Nuclear Physics

Nuclear physics at the laboratory encompasses basic experimental and theoretical research, and applications to isotope production, nuclear weapons, and nuclear threat reduction. Applications of nuclear physics are discussed elsewhere in this document. The program is well aligned with national community priorities, as described in the Nuclear Science Advisory Committee (NSAC) Long Range Plan.

The divisions involved in this theme area are: International, Space, & Response (ISR); Los Alamos Neutron Science Center (LANSCE); Physics (P); Theoretical (T); and the two applied divisions (XCP and XTD).

The experimental nuclear physics program focuses on tests of the Standard Model (neutron and neutrino physics), studies of QCD in extreme conditions (quark-gluon plasma and nucleon spin), nuclear astrophysics, and nuclear data. The effort includes more than 20 staff members and more than 25 postdocs. Experiments are performed at LANSCE, RHIC, SNS, FNAL, and Jlab, involving multi-institution collaborations. There is close coupling between experimental and theoretical efforts in many areas.

Theoretical nuclear physics is crucial to the laboratory in many of its basic goals in both fundamental and applied physics. The fundamental theory effort includes 6 staff members and 6 postdocs. The nuclear theory effort directly supports the national nuclear physics program and the LANL experimental program in neutrino physics, fundamental symmetries, and heavy ions. Partnerships are being developed with astrophysicists in T and CCS divisions, and with nuclear

[1] Since our last review in 2007.

experimentalists at LANSCE in the area of nuclear astrophysics. Several staff members are involved in both basic and applied physics.

One nuclear theory staff member received a PECASE award recently. In addition we have been quite successful with the topical collaboration program, LANL is the lead institution of one center on 'Neutrino Physics and Dense Matter', the center includes scientists from UCB, UCSD, MIT, and other leading institutions. This center is working closely with the LANL astrophysics initiative. We also participate in another center funded at LBNL on RHIC physics.

Fundamental experimental nuclear physics supports laboratory missions both directly and indirectly. Indirectly, these efforts maintain the nuclear physics capability by maintaining and enhancing the skills of lab scientists, encouraging connection to outside institutions, and attracting top scientific talent to the lab. Laboratory missions are directly supported by scientists who work on both basic and applied nuclear physics programs, or crossover completely to applied nuclear physics, and from spinoffs from basic to applied science. Examples of the former include the sharing of scientific staff between the Ultracold Neutron Project and Proton Radiography, and scientists who have started with the PHENIX experiment and later used their detector expertise in nuclear threat reduction efforts. Examples of the later include Proton Radiography, Muon Tomography, and Proton Active Interrogation.

Key areas of nuclear physics research:

Measurement of transverse single-spin asymmetries at RHIC. These measurements provide information on quark and gluon dynamics within the nucleon. First observation of SSA in quasi-elastic ^{3}He(e,e'). This provides the first information on quark angular motion inside the neutron, complementing previous work on the proton.

Extraction of J/Ψ suppression in cold nuclear matter. These results are essential for understanding heavy ion measurements of quark-gluon plasma properties and have enabled a new analysis of Au+Au data. Suppression beyond what can be explained by cold nuclear matter effects is clearly seen.

Neutrinos. New analysis of the SNO results with a lower energy threshold, resulting in a substantially improved measurement of the 8B neutrino flux from the sun. Completion of neutrino oscillation measurements at MiniBooNE, and collection of partial anti-neutrino oscillation data. Progress to the Majorana Demonstrator experiment to detect neutrinoless double beta decay. Neutrino cross section measurements have also been performed.

Neutrons. The UCNA experiment has published a 4% measurement of the electron-spin asymmetry A in neutron decay, and collected data for a 1% measurement. The NPDGamma experiment has been moved to SNS, and is being installed for an

improved measurement of parity violation in neutron-proton capture. The nEDM project has made substantial progress toward resolving the remaining R&D issues toward a measurement of the neutron electric dipole moment.

Nuclear Data. Several cross section measurements have been performed, including a precision measurement of neutron capture on ^{241}Am from thermal to 320 keV. This cross section is important for advanced reactor designs and defense applications.

Overall Status. The fundamental experimental nuclear physics program is overall quite strong. Its major competitors are often its major collaborators. These include Office of Science labs (BNL, JLab, LNBL, ORNL), foreign national laboratories (ILL), and large university research groups. The Nuclear Theory program is quite strong. Its main competitors are other national lab groups (BNL, ANL, JLAB, ORNL, LLNL) and larger university groups (UW, UM). LANL is particularly strong at the intersections of nuclear physics with astrophysics and particle physics.

Challenges and Issues. LANL has successfully started major experimental efforts using LDRD funds, and then transitioned them to DOE-NP funding (nEDM, SNO, FVTX, etc.) This model is threatened by constrained funding at DOE-NP (e.g. Majorana will need to transition in FY12), and increased competition for LDRD funds from other fields for starting new projects. The Ultra Cold Neutron effort is underfunded and is at risk without additional DOE-NP funding. If UCN ceases, there will be no substantial basic experimental effort in nuclear physics remaining at LANL, jeopardizing capabilities. Experimental nuclear astrophysics currently has no funding beyond LDRD. Without new DOE-NP funding, this effort is at risk. Pending retirements threaten several efforts (in particular nEDM and PHENIX), though our success in hiring young scientists over the past three years suggests this can be managed. The environment for performing experimental work continues to become more difficult, driven primarily by increasing requirements from NNSA in the areas of safety compliance, cybersecurity, and foreign nationals. Because of cybersecurity compliance issues, foreign nationals have had a particularly difficult time getting significant work done.

Particle Physics

All of the work in particle physics at the Laboratory is in high-energy physics (HEP). There are two experimental activities in this theme area: DEAP/CLEAN and Long Baseline Neutrino Experiment (LBNE). The HEP theory effort covers five main areas: TeV scale/LHC physics, particle astrophysics, neutrinos, lattice QCD, and field theory in curved space-time and at finite temperature.

The divisions involved in this theme area are: Physics (P) and Theoretical (T).

DEAP/CLEAN is searching for weakly interacting massive particles (WIMPs), which

may explain the dark matter of the universe. Motivation for WIMPs comes from the theory of Supersymmetry (SUSY), which predicts that the lightest SUSY particle would be stable and would be an excellent dark matter candidate. DEAP/CLEAN will start taking data soon at SNOLAB.

The competition in searching for WIMPs is very intense, worldwide there are 8-10 collaborations developing different technologies. However, the DEAP/CLEAN team has a clever experimental design involving only the observation of scintillation light in Liquid Argon. This approach, if successful, has the advantage that it would be easy to scale up to much larger detectors at affordable costs. DEAP/CLEAN should begin taking data later this year. The main drawback of the LANL DEAP/CLEAN effort is presently supported solely by LDRD funding, however, a proposal to DOE HEP has reviewed favorably and there is a strong probability it will receive support to enable it to compete for a Generation-2 experiment.

The LBNE project aims to search for CP violation in the lepton sector by shooting a neutrino beam from Fermilab to large detectors located at the Deep Underground Science Laboratory (DUSEL). The signature for CP violation would show up as a difference between muon-neutrino to electron-neutrino oscillations compared with antimuon-neutrino to antielectron-neutrino oscillations. The observation of CP violation in the lepton sector is especially important because it may help explain the matter asymmetry of the universe. The LANL team has taken responsibility for the near detector located at Fermilab.

LBNE is one of the flagship experiments of the US HEP program and will have the best sensitivity in the world for searching for CP violation. LBNE recently obtained CD-0 from DOE and hopes to reach the CD-1 milestone within the next year and CD-2 by the end of 2012.

The TeV scale/LHC physics effort involves 3 staff scientists, as well as 2 past postdocs[2] and one current postdoc. Two new postdocs joining us in Fall 2010 are expected to contribute to this effort. This work is broadly defined in several directions: developing techniques to infer the new physics at the Large Hadron Collider; improving theoretical understanding of theories of new physics at the TeV scale; and improving the theoretical understanding of electroweak baryogenesis. The team has written a number of well-cited papers.

This TeV scale/LHC effort is well-aligned with the Beyond the Standard Model (BSM) Grand Challenge and responds directly to the LDRD Program Office call to "develop new theory to search for BSM physics" at the Large Hadron Collider. It is a small but high quality collaboration that is part of a very large international effort. It provides a very necessary tie of the LANL HEP effort to the base effort of DOE HEP mainstream international effort. This team is also working with the experimentalists on interpreting a discovery (or exclusion) of dark matter in the

[2] In the past 3 years.

DEAP/CLEAN direct-detection experiment, and on interpreting forthcoming LHC p-p collision data.

Lattice QCD. Two staff members are part of the US-wide HotQCD collaboration (R. Gupta is the co-leader along with R. Soltz of LLNL). This collaboration is calculating the properties of QCD at finite temperature, in particular the equation of state of the quark gluon plasma and the nature of the chiral and deconfining transition. The first results for the equation of state based on over 200 million node hours of computer time was published in March 2009 and has already received 83 citations. This equation of state is now being used by phenomenologists to analyze RHIC data and to model the evolution of the quark gluon plasma. A second paper discussing the nature of the chiral and deconfining transition is under preparation. This work has contributed to the development of the BlueGene L Supercomputer at LLNL and the collaboration will continue to work with LLNL scientists to help make future novel architecture machines user friendly. The HotQCD collaboration is also part of the USQCD SciDAC effort to develop exascale machines and has applied for computer resources for the next generation calculations. This theory effort complements the large experimental effort at RHIC supported by DOE NP.

Staff in T and P Divisions are involved in an effort to look for signals of BSM physics in neutron decays. The role of theory is to calculate matrix elements of non-standard operators that are induced by the presence of BSM interactions at the TeV scale. Precision (to within 10%) measurement of these matrix elements between a neutron and proton state in neutron decay are needed to interpret experiments that the team has proposed utilizing the Ultra Cold Neutron (UCN) source at LANL. The experiment is timely as there exists a window of opportunity of 2-4 years for the LANL team before other UCN sources in Europe become competitive for this experiment. An additional strength (uniqueness) of the LANL team is that it has a well-balanced approach involving theory, simulation and experimental efforts and building on LANL UCN capability. An LDRD-DR proposal has been submitted for a first measurement of the (b, B) parameters which, if funded, will allow the team to apply to DOE NP for a full scale experiment in 3 years.

Field theory in curved space-time and at finite temperature. This effort involves one staff member and a past postdoc and it has addressed the issue of the trace anomaly and the emergence of scalar degrees of freedom in effective theories of gravity, and non-singular alternatives to black holes. The work on field theories at finite temperature has had significant impact. The effort is small and underfunded. Opportunities to find connections of this body of work to other LANL efforts are being explored.

Astrophysics and Cosmology

From first generation scientists like Robert Oppenheimer and Hans Bethe through to the current generation of LANL scientists, astrophysics and cosmology have been

tied to the primary mission of LANL, the development of nuclear weapons and the maintenance of the stockpile. Achieving an understanding of nuclear reactions, radiation transport, and equations of state in stars has helped weapons designers to better understand nuclear explosions and to verify the nuclear weapons codes. In the current era of stockpile stewardship without actual testing, the exciting problems posed by astrophysics and cosmology are providing an important test-bed for developing high-performance computing techniques, modeling complex systems over wide dynamic ranges, verifying programmatic codes, and developing techniques for the quantification of margins and uncertainties needed to address key national needs.

Since the signing of the Limited Test Ban Treaty in the early 1960's, another important part of the LANL mission has been to help monitor and reduce the threats posed to our nation by the advanced technology of others. The initial impetus provided by the need to monitor Soviet compliance with the Test Ban Treaty led to LANL's first space missions—called the Vela satellites—which carried gamma-ray, x-ray, and energetic particle detectors into space. While demonstrating the world's first nuclear explosion monitoring capability and acting as a deterrent to Soviet atmospheric nuclear testing, those satellites also enabled the discovery of previously unimagined extreme astrophysical phenomena like gamma-ray bursts (GRBs), soft gamma-ray repeaters, and x-ray bursts. This healthy synergy between open astrophysics and classified programmatic work continues today. To give just one example: the effort at LANL that led to the successful development of the on-board, real-time software for triggering on and spatially localizing GRBs for the NASA's Swift satellite helped develop techniques and concepts that are now applied to nuclear explosion monitoring.

In the three years since the last capability review, our expertise in astrophysics and cosmology has helped the laboratory achieve its goal of broadening LANL's contributions to National Security Missions. In particular, our expertise with autonomous robotic telescopes, real-time knowledge extraction, and machine learning played a key role in the opening of a new area of mission space for the laboratory—Space Situational Awareness (SSA). The ever-increasing reliance of our nation on space based assets for commerce and security is making improved SSA an important national need. Our ability to demonstrate new, advanced, approaches to SSA has fostered new investments by external sponsors and broadened the scope of LANL contributions to global security.

The divisions involved in this theme area are: Computer, Computation, & Statistical Sciences (CCS); International, Space, & Response (ISR); Los Alamos Neutron Science Center (LANSCE); Physics (P); Theoretical (T); and the two applied divisions (XCP and XTD).

Key areas of nuclear physics research:

Life and Death of Stars. A key effort in astrophysics theory focuses on the life and death of stars with an emphasis on the study of transients from stellar objects including X-ray bursts, X-ray flares, supernovae and gamma-ray bursts. This effort includes scientists from XTD, XCP, ISR, CCS, and T-divisions (with experimental constraints placed by scientists in P and LANSCE divisions). One of the primary successes of this effort over the past 3 years has been the development of a program to model the emission from astrophysical transients. Using codes developed under ASC (Cassio, RAGE), LANL astrophysicists have completed some of the first spectra from transients based on radiation-hydrodynamics calculations. These models both leverage off of ASC capabilities in computational radiation-hydrodynamics and off of Laboratory-mission physics expertise in atomic physics, turbulence theory, and nuclear physics.

This thrust has strong ties to computational and computer science at LANL (the Cassio code has been ported to the Roadrunner machine), mission-relevant physics (atomic, turbulence, nuclear), and many experimental programs studying radiation flows, atomic opacities and convective instabilities. These ties make this thrust an ideal recruiting field for LANL programs, leading to a newly developed program-funded Astrophysics Initiative. The initiative provides funding for post-doctoral fellows supporting this thrust in an effort to recruit highly-qualified potential staff for the programs. This "life and death of stars" effort also couples to the goals of the Office of Science (both nuclear physics and ASCR including both DUSEL and FRIB), supports a number of NASA missions (Swift, NuSTAr, EXIST, JDEM) and ground-based transient studies (Raptor, LSST, PTF, and, for gravitational waves, LIGO). This thrust has also led to key collaborations with outside institutions such as the Chicago FLASH team, the NuGrid nucleosynthesis team, and the Caltech transient team. LANL has become one of the leading institutions in the world studying astrophysical transients and boasts the broadest in-house group tying together nuclear physics and experiment to astrophysical theory. Finally, this effort is designed to support the observational program in transients at LANL.

Computational Cosmology. Research at LANL in the area of computational cosmology has largely been aimed at cosmological structure formation probes of dark matter and dark energy. The key personnel include 5 staff in CCS and T Divisions as well as 4 postdocs (2 of them named postdocs). In addition, several other staff members play major roles in this effort (including post-docs and students). Collaborating institutions include ANL, CMU, FNAL, Johns Hopkins, UC Berkeley/LBNL, UC Davis, UC Santa Cruz, and Maryland. This team has developed new precision tools for investigating Beyond the Standard Model science using cosmology. This has resulted in a large body of well-cited papers, many invited talks, and wide recognition as a leading effort nationwide. The new hybrid cosmology code developed at LANL is now being ported to the next-generation systems that will soon be available at ANL (Blue Gene Q) and ORNL (hybrid).
This research area is one of the central components of LANL's Beyond the Standard Model Grand Challenge and is an essential component of LANL's NPAC strategy. The research program is aligned with the national community priority for large-scale

cosmological surveys such as SDSS-III, DES, LSST (LANL is an institutional member), and JDEM. Funding support has been provided LANL LDRD (DR and ER), by DOE HEP's Dark Energy R&D program, and by NASA.

Stellar Astrophysics. Stellar astrophysics theory has a long tradition at LANL and comprises stellar structure and stellar evolution including stellar pulsations, stellar winds, and nucleosynthesis in stars, compact stars like white dwarfs and neutron stars. LANL has a strong group working on stellar oscillations as a means to probe stellar interiors and to compare with models, as well as instabilities and mass ejection by massive stars. Since the last review, LANL scientists have became involved with the exciting new astroseismology observations of 100,000 stars that are being collected by NASA's Kepler mission. These observations and their interpretation will have a profound impact on some of the key open questions in stellar astronomy.

Plasma Astrophysics. LANL scientists have leveraged off of plasma physics expertise at LANL to study a wide range of astrophysical problems from solar flares to accretion disks around massive black holes. LANL scientists are modeling instabilities in disks around black holes and the generation of magnetic fields in these disks. These magnetic fields can produce outflows in GRBs and AGN and LANL scientists have studied both, comparing nucleosynthetic yields to observations in the case of GRBs and comparing radio lobes to observations for AGN. LANL scientists have also studied particle acceleration in magnetic plasmas for the Galactic Center and in supernova remnants.

High-Energy Transients. Since the discovery of Gamma-Ray Bursts and X-Ray Bursts by LANL instruments aboard the Vela satellites, we have been leaders in the study of explosive astrophysical transients. Today's premier observatory for the study of GRBs is the Swift spacecraft. The core of this fully autonomous, rapid-response capability is high-performance, real-time transient recognition software that was written at LANL. This software has allowed Swift to detect and localize nearly 500 Gamma Ray Bursts and has enabled a number of new discoveries since the last review. For example, it enabled the discovery of the most distant object ever detected in the Universe—GRB 090423 at $z\sim8.2$ Another key discovery was the Soft Gamma-Ray Repeater (SGR) J0418+5729, which subsequent detections of pulsed x-ray emission showed is a spinning magnetar.

With the launch and deployment of the Fermi gamma-ray space telescope in June 2008, LANL simulation and modeling software for the Gamma-ray Burst Monitor (GBM) instrument began to be exercised in an operational setting. In 1.5 years of successful operation, GBM has recorded data from more than 420 gamma-ray bursts, several of which were recorded simultaneously by the Fermi Large Area Telescope. Combined results from the two instruments are providing an unprecedented look at the prompt emission from GRBs over 6 decades in energy, including several surprising discoveries. The LANL models are an important

ingredient used in the analysis of all GBM data. The simulation capability upon which the models are based is being used to enhance the GBM software for GRB localization and spectral analysis. This capability has also been successfully transitioned for use on applied programs.

Optical Transients. The RAPTOR/Thinking Telescopes at LANL have continued to make world-class measurements of the optical emission from gamma-ray bursts during the critical first few minutes after the onset of a gamma-ray burst. For example, on March 19, 2008, our full sky persistent monitors detected a flash of light from a gamma ray burst (GRB080319b) that reached a peak apparent magnitude of 5.3 magnitude while the gamma-rays were being emitted. The absolute magnitude of this flash makes it the most luminous optical transient ever detected by mankind. Our Thinking Telescopes system made observations that include measurements of location before the GRB burst. Our observations were made with seven different telescopes in our Thinking Telescope system and provided an unmatched observational record of optical emission from this amazing GRB. Another key scientific accomplishment came from our study of the early afterglows from all GRB with measured distances. We found the afterglows with plateaus and slow-rises may be accommodated by a single model.

Very High-Energy Gamma Rays. Nature accelerates particles to energies exceeding one Joule, yet these astrophysical accelerators are not known. Observational research in P Division at LANL is working to determine the sources and acceleration mechanisms in the extreme objects that are predicted to accelerate particles to the highest energies. These objects include massive black holes in active galactic nuclei, shocks in supernova remnants, and intense electromagnetic fields around spinning pulsars. This work is involved with the HiRes Ultra High Energy Cosmic Ray Detector, and the NASA's Fermi Large Area Telescope (LAT), and in collaboration with the University of Maryland and several universities in Mexico the development of the HAWC (High Altitude Water Cherenkov) observatory—a next generation wide-field TeV gamma-ray observatory. Since the last review, analysis of the measurements from the first generation experiment, Milagro, revealed two unexpected excesses of 10 TeV cosmic ray emission with angular size of about 10° of unknown origin. We also demonstrated that several sources detected by the Fermi LAT extend to multi-TeV energies including the Fermi pulsar, J2229.0+6114, in the Boomerang pulsar wind nebula and the Fermi pulsar, J0634.0+1745.

Planets and Asteroids. Planetary studies at LANL also take advantage of the strong computational and computer science resources at LANL. In addition, theoretical expertise in warm, dense matter is ideally suited to contributing to equations of states for astrophysical problems from asteroids and planets through brown dwarf stars. Under NASA funding, LANL is working on equations of state effects on planetary observations. LANL scientists have also modeled ways to mitigate the earth-striking asteroids and have begun an extended collaboration including scientists at LLNL and the Southwest Research Institute.

Overall Status. The theoretical astrophysics and cosmology efforts at Los Alamos collaborate and compete with world-leading groups in the field. An important aspect of the LANL efforts is that they are not focused in one group, but distributed among several groups and divisions. In fact, the cross-divisional nature of the efforts has brought together research teams that are unique world-wide. The diversity in expertise, including theory, modeling, computational science, statistics and computer science, already has led to potentially very important new developments that would have been very difficult to achieve at a University. Important theory results include precision computations of the cosmological dark matter halo mass, dark energy studies, detailed spectra of astrophysical transients including nuclear physics effects, and studies of binary progenitors of both gamma-ray bursts and supernovae.

Our observational capabilities are also exceptional. Out of approximately a dozen groups that have deployed rapid-response telescopes around the world that aim to explore the optical emission during the critical first few minutes of a GRB, our RAPTOR instruments provide the most powerful combination of speed, sensitivity, and capability. In the past three years, our rapid-response capabilities have been upgraded even further, with a new capability to make high-cadence (>1Hz) measurements of prompt optical emission that is a thousand times fainter than our closest competition. We deployed instruments with an unmatched capability to make simultaneous multi-color optical observations while the gamma-rays from GRBs are still being emitted. Altogether, our capabilities place LANL at the forefront of the effort to understand the optical light from GRBs during the critical first few minutes.

In space-based astrophysics, while still the strongest institution in the DOE complex, we are weaker than institutions like NASA Goddard and are no longer viable in competitions for entire major missions. We are the acknowledged experts in using coded apertures for high-energy observations in space. We are also recognized as world leaders in the autonomous real-time localization of astrophysical transients from space. This capability, as well as our extensive experience with on-board computing for complex missions like the XMM Newton mission, positions us well for significant contributions to potential future missions like the JANUS and the Joint Dark Energy Mission. Nevertheless, while we lead the world in development of rapid-response instruments for optical observations of GRBs, we are losing our edge in the development of space-based high energy instruments. A key goal of our new strategic plan is to re-invigorate our capability with new investments in high-energy instruments that are deployed on sub-orbital platforms.

Our Milagro experiment was the first detector to use the water Cherenkov technique to survey the TeV sky, and has more than doubled the number of known TeV

sources. A second-generation detector, the High Altitude Water Cherenkov (HAWC) observatory, has been proposed, which would have more than an order of magnitude sensitivity and would complement other efforts in TeV neutrino and gamma-ray astronomy. IceCube is an NSF project to observe TeV neutrinos, and HAWC would greatly improve the sensitivity of IceCube by identifying new and flaring TeV gamma-ray sources that are likely also to be TeV neutrino sources. Most other TeV gamma-ray observatories detect atmospheric Cherenkov radiation and are therefore pointed instruments that need survey observatories like HAWC to determine which sources emit at TeV energies. The field of particle astrophysics is growing, with new observatories funded by NASA, NSF, and DoE; and LANL is a leader in this research area, which has been endorsed in several National Academy studies.

Our recent high-impact results show an impressive diversity. As befits a national laboratory, Los Alamos researchers have played active roles in national and international collaborative efforts. Very successful annual workshops in astrophysics and cosmology are organized and run by Los Alamos and university collaborators.

Challenges and Issues. Astrophysics and cosmology along with their supporting capabilities are spread across the Laboratory. Despite the good level of collaboration that characterizes the current research program, we do not have a focal point for interactions. It also would help to address issues regarding external and internal visibility, the sheer scope of the LANL program having led to some dilution in this regard.

Another issue is a stable base of funding support over an extended period of time. A large fraction of astrophysics and cosmology is supported by internal LDRD funding. By its very nature, LDRD is designed to be project-oriented and has only a 3-year timeline. This base duration is often much too short to allow new programs to establish themselves, especially in the case of experimental and observational projects.

Finally, while there are signs of improvement, two major issues hinder efficient work at the Laboratory: (1) The difficult process of gaining access to computer resources for foreign nationals and (2) the high level of paperwork for external collaborations.

Applied Physics

In addition to research in fundamental science, significant components of NPAC activities involve addressing a diverse set of problems for national security. These applications arise as natural extensions of our basic research program, and many members of LANL's NPAC community work in both fundamental and applied physics.

The problems being addressed range from the Global Nuclear Energy Partnership (GNEP) to homeland security, from nuclear weapons physics to nuclear detectors in space.

All of the divisions that the NPAC program spans are involved in these program, namely, Chemistry (C); Computer, Computation, & Statistical Sciences (CCS); International, Space, & Response (ISR); Los Alamos Neutron Science Center (LANSCE); Physics (P); Theoretical (T); and the two applied divisions (XCP and XTD). The cross-disciplinary nature of the research results in collaborations across several directorates.

For homeland security, or more generally "ground-based threat reduction," members of the NPAC capability in C, CCS, LANSCE, P, T, ISR, and X divisions are working on detection of nuclear material threats from both an experimental and modeling point of view. This work involves passive and active interrogation and nuclear forensics. One successful scheme is muon radiography, using cosmic ray muons to detect high-Z material hidden in trucks or other vehicles. Several innovative detection and characterization schemes are being developed including hybrid Compton/coded aperture gamma-ray imaging and hybrid neutron/gamma imaging, which use the scattering properties of different particle species to derive information about source direction, distance, and energy. These techniques were originally developed for astrophysics, and LANL expertise in this area has provided a competitive advantage. These passive detector technologies are being coupled to passive and active interrogation systems. Development of particle beam technologies and associated modeling capabilities is expanding for several sponsors including Department of Homeland Security/DNDO, the Defense Threat Reduction Agency, and Department of Energy/NA-22. Many of these projects involve LANL/industrial partnerships so as to ease and speed the transition from R&D to production and use (and also because of the fact that some sponsors like DHS/DNDO specifically forbid LANL from being the lead institution). In a parallel effort we continue to characterize the delayed neutron and gamma spectra from active interrogation of special nuclear materials (SNM) and the effects that shielding might have.

An equally important program for homeland security is the Domestic Nuclear Event Attribution program aimed at developing the nuclear forensic capability to determine the design, nuclear material, and ideally the origin of a device in the event of a terrorist nuclear attack. Within the NPAC capability we are involved in determining key nuclear cross sections for forensic analysis of nuclear debris, examining possible proliferant devices, and determining the radiochemical signatures expected for these.

A number of projects are focused on addressing issues related to certifying the nation's stockpile. These include dynamic experiments using proton radiography at LANSCE, as well as dynamic experiments at the Nevada Test site. Quantification and minimization of the uncertainties in weapons performance and weapons diagnostics call for high precision nuclear cross sections and spectra, and a number of high-impact measurements have been carried out at LANSCE. A cross-divisional LDRD DR project, aimed at coupling prompt and radiochemical diagnostics, has been very successful in developing new metrics for

certification.

LANL capabilities in space-based radiation detection instrumentation and the growing national security field of space situational awareness (SSA) continue to benefit from heritage and ongoing work in experimental astrophysics, particle physics, and nuclear physics. Historically, the science and applications of these programs developed in parallel. At times, data, technologies, and capabilities from applied missions have enabled scientific progress. At other times, scientific endeavors have enabled enhanced development ahead of applied programs that eventually proved to be important for those programs. These trends continue today with an evolving synergy between applied and scientific missions.

In the DOE/NNSA sponsored space-based nuclear detonation detection (SNDD) program there has been much activity in the past few years as new X-ray, gamma-ray, neutron, and particle sensor payloads are being developed for new generations of geostationary and Global Positioning System (GPS) satellites. These large endeavors mark the most active period of new development in the SNDD program in the past 25 years, and will ensure national SNDD capability for the next 20 years. The evolving LANL SNDD program has leveraged radiation detection capability and expertise from the particle and nuclear physics communities at LANL and beyond. Modeling and simulation capability from these communities has been particularly beneficial, and most SNDD sensor developers are now using standard tools and expertise from the nuclear/particle communities such as MCNPX and GEANT4. Much of the current workforce involved in SNDD sensor/science development came from these fields. In addition to taking on SNDD development roles, these same scientists are developing unique solutions for homeland security and other important applications. The challenge with this new workforce is to leverage their existing skills *and* teach them the specific skills and lessons needed for space-based instrumentation. An important part of this challenge is engaging the new scientific staff in astrophysics applications.

In the arena of space-based experimental astrophysics there continues to be good synergy between science and programs. LANL's involvement in the NASA *Swift* gamma-ray burst (GRB) mission continues, and expertise from *Swift* in modeling, simulation, and transient event analysis continues to be applied to programmatic applications. LANL continues to be involved in the new NASA *Fermi* gamma-ray space telescope mission. *Fermi*, launched in 2007, is providing a unique look at GRBs, and the modeling, simulation, and data analysis capability developed for the *Fermi* gamma-ray burst monitor (GBM) is being applied broadly in support of programmatic work. LANL astrophysics capability also continues to be a major driver and source of innovation in the development of "Thinking Telescopes" for ground-based space situational awareness. This endeavor, originally applied to the groundbreaking study of GRB prompt optical emission (supported by LDRD) is successfully transitioning to use in improved identification, tracking, and observations of low earth orbit satellites—one of the major thrusts of SSA.

There are significant challenges for LANL to continue its successful synergy between astrophysics and applications. There is no obvious target astrophysics mission with significant LANL involvement in the near (~5-yr) future. Part of the problem is that there are fewer opportunities for new space missions. For example, NASA has no concrete plans for a next mission in gamma-ray astronomy. Furthermore, the current and near-future DOE/NNSA budgets for space instrumentation have little capacity to support the development or demonstration of new technologies beyond those specifically needed for near-future programs. Internally, while there has been significant growth in programmatic work, there has also been a decline in hiring new staff. As a result, the current workforce is only sufficient to meet programmatic demands, and has little capacity for engagement in astrophysics. The NPAC council, and ISR divisions are working to develop strategic plans to address these issues.

Nuclear-, Particle-, Astro-Physics and Cosmology Capability Review

April 14-16, 2010

SELECTED STATISTICS CY2007-2010

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Invited Talks and Presentations

The distinction between invited talks and other presentations is often difficult to ascertain. At some meetings, the distinction is clear and relevant, while not so in others. Because such efforts would be subject to considerable error, we do not track this distinction in our databases. The following list of 459 invited talks and presentations reflects the major international involvement of the NPAC Capability Area staff.

Aidala, C., "Single-spin asymmetries and transverse-momentum-dependent distributions at RHIC", Electromagnetic Interactions with Nucleons and Nuclei 2009, Milos Island, Greece, September 2009.
Aidala, C., "Spin Physics at RHIC: Exploring Nucleon Structure Using Polarized Proton-Proton Collisions", Lecture at the European Graduate School on Complex Systems of Hadrons and Nuclei (HANUC), March 2009.
Bach, H. T., T. N. Claytor, et al. Ultrasonic And Radiographic Imaging Of Niobium Target Capsules For Radioisotope Production. Review Of Progress In Quantitative Nondestructive Evaluation, VOLS 28A AND 28B, 2 HUNTINGTON QUADRANGLE, STE 1NO1, MELVILLE, NY 11747-4501 USA, AMER INST PHYSICS.
Baker, R. M. L., Jr, et al. Analyses Of The Frequency And Intensity Of Laboratory Generated Hfgws. Space Technology And Applications International Forum Staif 2008, 2 Huntington Quadrangle, Ste 1no1, Melville, Ny 11747-4501 Usa, Amer Inst Physics.
Baker, R. M. L., Jr, et al. Proposed Ultra-High Sensitivity High-Frequency Gravitational Wave Detector. Space Technology And Applications International Forum Staif 2008, 2 Huntington Quadrangle, Ste 1no1, Melville, Ny 11747-4501 USA, Amer Inst Physics.
Berg, J. M. And M. P. Wilkerson Excitation Energy Dependence In Near-Infrared Photoluminescence Spectra And Dynamics Of Puo22+ In Cs2U(Pu)O2Cl4. Actinides 2008 - Basic Science, Applications And Technology, 506 Keystone Drive, Warrendale, Pa 15088-7563, Materials Research Society.
Berg, J. M. And M. P. Wilkerson Excitation Energy Dependence In Near-Infrared Photoluminescence Spectra And Dynamics Of Puo{Sub 2}{Sup 2+} In Cs{Sub 2}U(Pu)O{Sub 2}Cl{Sub 4}. Proceedings Of The Symposium Actinides 2008 - Basic Science, Applications And Technology, By Chung, B.; Thompson, J.; Shuh, D.; Albrecht-Schmitt, T.; Gouder, T. (Eds.), V. 1104, [260] Materials Research Society
Berg, J. M. and M. P. Wilkerson Excitation Energy Dependence In Near-Infrared Photoluminescence Spectra And Dynamics Of Puo_2^{2} In $Cs_2U(Pu)O_2Cl_4$. Actinides 2008 - Basic Science, Applications And Technology, Warrendale, PA, USA, Materials Research Society.
Bhattacharya, S., Cosmology Using Galaxy Clusters, Yale Colloquium, New Haven, CT, US, November 15, 2008.
Bhattacharya, S., Sunyaev-Zeldovich Effect, University of Illinois Seminar, Urbana-Champaign, IL, December 2, 2008.
Bhattacharya, T., CHAVI, 4th Annual Retreat, Durham, NC, September 7-10, 2008.
Bhattacharya, T., CHAVI, 5th Annual Retreat, Durham, NC, October 4-7, 2009.
Bhattacharya, T., Statistics in a Non-independent World, Phylogenetics Workshop, Santa Fe, NM, April 27, 2008.
Bhattacharya, T., Studying Acute HIV Evolution Using 454 Sequencing Technology, 4th Annual CAVD Meeting, Miami, FL, December 1-4, 2009.
Bond, E. M., J. R. Fitzpatrick, et al. Development Of A Rapid Technique To Separate U-235M From Pu-239. 229th National Meeting Of The American-Chemical-Society; 20050313 - 20050317; San Diego, CA
Bond, E. M., X. Gan, et al. Coordination Chemistry And Extraction Properties Of Phosphonopyridyl N,P Oxides. Actinides-97 Conference; 19970921 - 19970926 ; BADEN BADEN, GERMANY
Bredeweg, T. A. Neutron Capture Reactions At DANCE. Frontiers In Nuclear Structure, Astrophysics, And Reactions: FINUSTAR 2 ; 10-14 Sept. 2007; Crete, Greece, USA, AIP.
Bredeweg, T. A., M. M. Fowler, Et Al. Simultaneous Measurement Of (N,Gamma) And (N, Fission) Cross Sections With The DANCE 4 Pi Baf2 Array. 19th International Conference On Application Of Accelerators In Research And Industry; 20060820 – 20060825, ELSEVIER SCIENCE BV.
Bredeweg, T. A., M. M. Fowler, et al. Simultaneous Measurement Of (N,Gamma) And (N,Fission) Cross Sections With The DANCE 4 Pi Baf2 Array. Capture Gamma-Ray Spectroscopy And Related Topics, Amer Inst Physics.
Bredeweg, T. A., R. Julin, et al. Neutron Capture Reactions At DANCE. Frontiers In Nuclear Structure, Astrophysics, and Reactions, Amer Inst Physics.

Bredeweg, T. A., U. Agvaanluvsan, et al. Recent Actinide Nuclear Data Efforts With The DANCE 4 Pi Baf2 Array. International Conference On Nuclear Data For Science And Technology, Vol 1, Proceedings, France, E D P SCIENCES.
Brooks, M., "Forward Silicon Vertex Detector and Muon Tracker Physics Overview", PHENIX Forward Upgrade Meeting, Santa Fe, NM, May 17, 2007.
Brooks, M., "Measurement of Heavy Flavor and Quarkonia Production by PHENIX", ICHEP08, Philadelphia, PA, July 2008.
Brooks, M., "Silicon Upgrades, the VTX and FVTX Detectors," Heavy Quark Physics in Nucleus-Nucleus Collisions Workshop, UCLA, January 2009.
Carlson, J., Coherent Neutrino Oscillations in Supernovae, APS Spring Meeting, Jacksonville, FL, April 2007.
Carlson, J., Cold Atoms and Neutron Matter: Theory vs. Experiment, Workshop on Cold Atoms and RHIC Physics, Copenhagen, Denmark, June 2008.
Carlson, J., Equation of State and Pairing Gaps in Low-Density Neutron Matter and Cold Atoms, MSU Workshop on Mesoscopic Physics, Minneapolis, MN, October 2007.
Carlson, J., Equation of State and Pairing Gaps in Low-Density Neutron Matter and Cold Atoms, UNEDF SCIDAC Workshop, Pack Forest, WA, August 2007.
Carlson, J., Equation of State and Pairing Gaps in Low-Density Neutron Matter and Cold Atoms, MSU Workshop on Mesoscopic Physics, Madison, WI, October 2007.
Carlson, J., GFMC Then and Now in Nuclear Physics, Workshop on the 40th anniversary of GFMC, New York, NY, US, May 2007.
Carlson, J., Heavy-Light Fermions at Unitarity, Many-Body Physics Workshop, Seattle, WA, May 2009.
Carlson, J., Neutron Matter and Drops, UNEDF SCIDAC Workshop, Pack Forest, WA, June 2008.
Carlson, J., Neutron Matter and Drops, Workshop on Cold Atoms and RHIC Physics, Copenhagen, Denmark, June 2008.
Carlson, J., Neutron Matter: EOS, Spin and Density Response, PREX Workshop, Newport News, VA, June-July 2008.
Carlson, J., Neutron Matter: Equation of State, Spin and Density Response, JUSTIPEN 09, Oak Ridge, TN, February 2009.
Carlson, J., Pairing Gaps and Polarization in Cold Fermions, Workshop on Fundamental Neutron Physics, Seattle, WA, June 2007.
Carlson, J., Pairing Gaps in Low-density Neutron Matter and in Cold Atoms, Workshop on Neutron Star Crusts and Surface, Seattle, WA, June 2007.
Carlson, J., Spin Polarized Cold Fermi Atoms, Workshop on Intersections of Cold Atom and RHIC Physics, Trento, Italy, March 2007.
Carlson, J., Strongly-Coupled Fermions in Nature and the Laboratory, Confinement08, Mainz, Germany, September 2009.
Carlson, J., The Long and Short of Nuclear Structure, Nuclear Physics Gordon Conference, Providence, RI, July 2009.
Chadwick, M. B., R. C. Little, et al. Actinide ENDF/B-VII Cross-Section Evaluations And Validation Testing. International Conference On Physics Of Reactors - Nuclear Power, A Sustainable Resource ; 20080914 - 20090919 ; Interlaken, Switzerland
Cirigliano, V., Kaons as Laboratories for Fundamental Physics, Fermilab Academic Lectures 2009, Batavia, IL, May 2009.
Cirigliano, V., Leptogenesis in a Minimally Flavor Violating World, Heavy Quarks and Leptons 2008, Melbourne, Australia, June 2008.
Cirigliano, V., Leptogenesis with Minimal Flavor Violation, INFO 07, Santa Fe, NM, July 2007.
Cirigliano, V., Lepton Flavor Violation, CP Violation, and Leptogenesis, INT Workshop on EDMs and CP Violation, Seattle, WA, March 2007.
Cirigliano, V., Minimal Flavor Violation in the Lepton Sector, 2nd Project X Physics Workshop, Batavia, IL, January 2008.
Cirigliano, V., Naturalness Bounds on Neutrino Magnetic Moments, Melbourne Neutrino Theory Workshop, Melbourne, Australia, June 2008.
Cirigliano, V., On the Model Discriminating Power of μ to e Conversion in Nuclei, INT Workshop in Muon Physics in the LHC Era, Seattle, WA, October 2008.

Cirigliano, V., Precision Tests of the Standard Model with Kl3 Decays, KAON 07, Frascati, Italy, May 2007.
Cirigliano, V., Probing New Physics with Semi-Leptonic Kaon Decays, Workshop on Hints of New Physics in Flavor Decays, Tokyo, Japan, March 2009.
Cirigliano, V., Probing the Standard Model with (Semi)-Leptonic Meson Decays, T-2 Colloquium, Los Alamos, NM, February 2009.
Cirigliano, V., Theoretical Progress in Electroweak Baryogenesis, Gordon Research Conference in Nuclear Physics, Newport News, RI, July 2007.
Cirigliano, V., Theory of Rare Pion and Kaon Decays, Conference on the Intersections of Particle and Nuclear Physics, San Diego, CA, May 2009.
Cirigliano, V., Weak Scale Baryogenesis and its Experimental Probes, COSMO 08, Madison, WI, August 2008.
Cizewski, J. A., K. L. Jones, et al. Neutron Transfer Reactions: Surrogates For Neutron Capture For Basic And Applied Nuclear Science. Conference On The Application Of Accelerators In Research & Industry, Fort Worth, TX, USA, 01-AUG-08, United States.
Cooper, M. D. for the nEDM Collaboration, "Development of a neutron electric dipole moment experiment at the SNS," DNP and Japan Phys. Soc. Meeting, Waikaloa, HI (2009)
Cooper, M. D., "It's Only A Matter of Time (Reversal): A New Search for the Electric Dipole Moment of the Neutron," VII Latin American Symposium on Nuclear Physics and Applications, Cusco, Peru (June, 2007, AIP).
Couture, A., Avaanluvasan, U., Baker, J., Baramsai, B., Becker, J., Bond, E., Bredeweg, T., Fowler, M., Haight, R., DANCING With the Stars: Measuring Neutron Capture on Unstable Isotopes with DANCE, 20th International Conference on the Application of Accelerators in Research, Fort Worth, TX, August 10, 2008
Couture, A., Avaanluvasan, U., Baker, J., Baramsai, B., Becker, J., Bond, E., Bredeweg, T., Fowler, M., Haight, R., DANCING With the Stars: Measuring Neutron Capture on Unstable Isotopes with DANCE, 8th LANSCE User Group Meeting, Los Alamos, NM, June, 2008.
Couture, A., E. M. Bond, et al. Neutron Capture Measurements On Plutonium Isotopes For GNEP. 8th International Topical Meeting On Nuclear Applications And Utilization Of Accelerators, ACCAPP'07, 555 North Kensington Avenue La Grange Park, IL 60526, United States, American Nuclear Society.
Couture, A., Neutron Physics for Nuclear Astrophysics at Los Alamos, University of Norte Dame/South Bend, IN, January 23, 2009.
Couture, A., R. Reifarth, et al. Neutron Capture Measurements On Tl-Isotopes At DANCE. INTERNATIONAL CONFERENCE ON NUCLEAR DATA FOR SCIENCE AND TECHNOLOGY, VOL 1, PROCEEDINGS, 17 AVE DU HOGGAR PARC D ACTIVITES COUTABOEUF BP 112, F-91944 CEDEX A, FRANCE, E D P SCIENCES.
Couture, A., S-Process Nucleosynthesis Studies with DANCE, JINA Lunch Discussion/East Lansing, MI, March 26, 2009.
Couture, A., U. Agvaanluvsan, et al. Danceing With The Stars: Measuring Neutron Capture On Unstable Isotopes With DANCE. APPLICATION OF ACCELERATORS IN RESEARCH AND INDUSTRY, 2 HUNTINGTON QUADRANGLE, STE 1NO1, MELVILLE, NY 11747-4501 USA, AMER INST PHYSICS.
Dashdorj, D., G. E. Mitchell, et al. Study Of The Photon Strength Functions For Gadolinium Isotopes With The DANCE Array. Application Of Accelerators In Research And Industry. Twentieth International Conference ; 10-15 Aug. 2008 ; Fort Worth, TX, USA, USA, American Institute Of Physics.
Dingus, Brenda L. "Cosmic Ray Anisotropies Observed by Milagro", Snowbird Particle Astrophysics and Cosmology Symposium, Utah, February 2009.
Dingus, Brenda L. "Gamma Ray Astrophysics with Milagro and Fermi", Nuclear Physics Gordon Conference, July 2009.
Dingus, Brenda L. "Gamma Rays to Probe the Origin of Galactic Cosmic Rays", University of Heidelberg Astronomy Colloquium, June 2009.
Dingus, Brenda L. "Gamma-Ray Astrophysics", Multi-Messenger Relativistic Astrophysics Inaugural Conference, Center for Relativistic Astrophysics, Georgia Tech University, May 2009.
Dingus, Brenda L. "HAWC (High Altitude Water Cherenkov) Observatory Surveying the TeV Sky", TeV Particle Astrophysics Symposium, Stanford Linear Accelerator, July 2009.

Dingus, Brenda L. "High Altitude Water Cherenkov (HAWC) for Surveying the TeV Sky" at European Cherenkov Telescope Array Workshop, Barcelona, Spain, January 2008.
Dingus, Brenda L. "High Altitude Water Cherenkov (HAWC) for Surveying the TeV Sky" at Future Gamma-Ray Observatories, Stanford Linear Accelerator, December 2007.
Dingus, Brenda L. "Milagro and HAWC Surveying the TeV Sky", University of New Mexico Physics Department Colloquium, September 2009.
Dingus, Brenda L. "Milagro and HAWC TeV Gamma-Ray Observatories", Fermilab Seminar, September 2008.
Dingus, Brenda L. "Milagro Observations and HAWC expectations of the TeV sky" at Institute for Nuclear, Particle, Astrophysics and Cosmology Symposium, UC Berkeley, May 2007.
Dingus, Brenda L. "Multiwavelength Astronomy", Neutrino 2008, Christchurch, New Zealand, May 2008.
Dingus, Brenda L. "Recent Gamma-Ray Observations", International Astrophysics Symposium, Golden, CO, May 2008.
Dingus, Brenda L. "Surveying the multi-TeV Sky"at Ultra High Energy Cosmic rays, Neutrinos and Photons Symposium, Penn State, May, 2007.
Dingus, Brenda L. "Surveying the TeV Sky with Milagro & HAWC" at CalTech Astronomy Colloquium, February 2007.
Dingus, Brenda L. "Surveying the TeV Sky with Milagro and HAWC", University of Wisconsin H.T.Richards Lecture for the Physics Colloquium, October, 2008.
Dingus, Brenda L. "The TeV Sky as Observed by Milagro and HAWC, Dublin Institute of Advanced Studies Seminar, Ireland, February 2008.
Dingus, Brenda L. "The TeV Sky as Observed by Milagro and HAWC", Max Planck Institute Seminar, Heidelberg, Germany, February 2008.
Dingus, Brenda L. "The TeV Sky as Observed by Milagro and HAWC", Hulbert Colloquium, Naval Research Labs, Washington, DC, January 2008.
Dingus, Brenda L. "The TeV Sky", Ohio State University Astronomy Colloquium, March 2008.
Dingus, Brenda L. "Unexplained TeV Cosmic Ray Anisotropies", University of New Hampshire Physics Department Seminar, July 2009.
Elliott, S. "A Career in Science: The Rabbit's Choice," Convocation Speech, University of New Mexico Physics Department, Albuquerque, NM, May 2009.
Elliott, S. "Experimental Overview of Neutrinoless Double Beta Decay," Japan-US Seminar on Double Beta Decay and Neutrinos, Waikoloa, HI, October, 2009.
Elliott, S. "Neutrinoless Double Beta Decay," 238th American Chemical Society National Meeting, Washington, D.C., August 2009.
Elliott, S. "Neutrinoless Double Beta Decay: Solid-State and Semiconductor Detectors", 10th Conference on the Intersections of Particle and Nuclear Physics (CIPANP 2009), San Diego, CA, May 2009.
Elliott, S. "Neutrinoless Double Beta Decay", Neutrino Frontiers Workshop, Minneapolis, MN, October, 2008.
Elliott, S. "New Facilities and Instrumentation: Review," 10th Conference on the Intersections of Particle and Nuclear Physics (CIPANP 2009), San Diego, CA, May 2009.
Esch, E. I., A. Alpizar-Vicente, et al. Status Of The Neutron Capture Measurement On 237 Np With The DANCE Array At LANSCE. INTERNATIONAL CONFERENCE ON NUCLEAR DATA FOR SCIENCE AND TECHNOLOGY, PTS 1 AND 2, 2 HUNTINGTON QUADRANGLE, STE 1NO1, MELVILLE, NY 11747-4501 USA, AMER INST PHYSICS.
Forbes, M.M., A Unitary Fermi Supersolid: Applying a DFT to the Unitary Fermi Gas, Conference on Research Frontiers in Ultra-Cold Atoms, Trieste, Italy, May 2009.
Forbes, M.M., A Unitary Fermi Supersolid: Applying a DFT to the, IOQOI, Innsbruck, Austria, May 12, 2009.
Forbes, M.M., A Unitary Fermi Supersolid: The Larkin-Ovchinnikov Phase, UBC Theory Seminar, Vancouver, Canada, September 17, 2008.
Forbes, M.M., Density Functional Theories for Cold-Atoms and Nuclear Systems, RIKEN-TRIUMF Nuclear Theory Meeting, Vancouver, Canada, December 15, 2009.
Forbes, M.M., Observing Dark Matter, Los Alamos National Laboratory, Los Alamos, NM, November 25, 2008.

Fotiadis, N., Study of Nuclei Near Stability as Fission Fragments Following Heavy-Ion Fusions Reactions, 4th International Conference on Fission and Properties of Neutron-Rich Nuclei, Sanibel Island, Florida, November 11, 2007.
Friedland, A., Cosmological Probes of Neutrino Interactions, University of Washington, particle theory seminar, Seattle, WA, May 3, 2007.
Friedland, A., Neutrinos in Cosmology and Supernova, Fermilab, particle astrophysics seminar, Fermilab, IL, May 21, 2007.
Friedland, A., On the Photon Decay into Extra Dimensions, Caltech, High Energy Physics Seminar, Pasadena, CA, May 5, 2008.
Friedland, A., On the Photon Decay into Extra Dimensions, SLAC, Theoretical Physics Seminar, Palo Alto, CA, May 2, 2008.
Friedland, A., On the Photon Escape into Extra Dimensions, University of California, Berkeley, Particle Physics Seminar, Berkeley, CA, May 7, 2008.
Friedland, A., Probing Neutrino Interactions with WMAP and PLANCK, 2007 APS April meeting, Jacksonville, FL, April 16, 2007.
Friedland, A., RS2 and the Unparticle Scenario, Harvard University, High Energy Theory Seminar, Boston, MS, March 31, 2009.
Friedland, A., RS2 as a Realization of the Unparticle Scenario, MIT, Nuclear and Particle Theory Seminar, Boston, MA, March 9, 2009.
Friedland, A., Supernova Neutrino Oscillations at Late Times, University of New Mexico, Nuclear, Particle, Astroparticle and Cosmology Seminar, Albuquerque, NM, October 27, 2009.
Friedland, A., Supernova Neutrinos: Imprints of the Explosion, Number Violation (LBV09), University of Wisconsin, Madison, WI, September 23, 2009.
Friedland, A., Supernova Neutrinos: Imprints of the Explosion, Workshop on Supernova Physics and DUSEL, Los Angeles, CA, September 17, 2009.
Friedland, A., Supernova Neutrinos: Time Dependent Oscillation Features, Meeting of the Division of Particles and Fields (DPF 2009), Wayne State University, Detroit, MI, July 28, 2009.
Friedland, A., Supernova Turbulence and Neutrino Transformations, Melbourne Neutrino Theory Workshop, Melbourne, Australia, June 4, 2008.
Friedland, A., What Big Stars Can Tell Us About Tiny Particles, SNOWPAC 2009: Workshop On Particle Astrophysics, Astronomy & Cosmology, Snowbird, UT, February 6, 2009.
Friedland, A., What Big Stars Can Tell Us About Tiny Particles, University of Wisconsin, Madison, Physics Department Colloquium, Madison, WI, US, November 28, 2007.
Friedland, A., What Stars Can Tell us About Elementary Particles, University of Hawaii, Physics Colloquium, Honolulu, HI, February 14, 2008.
Fryer, C., Astrophysics using Computational Fluid Dynamics at LANL, Computational Fluid Dynamics, Baton Rouge, LA, 2008.
Fryer, C., Constraining the Asymmetries in the Supernova Engine, Focus Week on Messengers of Supernova Explosions, IPMU, November 2008.
Fryer, C., Double Neutron Star Mergers, KITP Supernova Workshop, September 2009.
Fryer, C., Lectures on Supernovae, Supernovae and Gamma-Ray Bursts in the Epoch of Reionization, Darjeeling, India, May 2008.
Fryer, C., Modeling White Dwarf Mergers, Hydrogen Deficient Stars Meeting, Tubingen, Germany, September, 2007.
Fryer, C., Neutrinos from the First Stars, SnowPAC09, Snowmass, UT, February 2009.
Fryer, C., Supernovae in the Transient Era, Harvard, Center for Astrophysics, Invited Colloquium, November 2009
Fryer, C., Supernovae in the Transient Era, NASA Goddard Space Flight Center, Invited Colloquium, December, 2009.
Fryer, C., The Role of B^2FH in Supernova Nucleosynthesis, American Physical Society April Meeting, Jacksonville, FL, 2007.
Fryer, C., The SN/GRB Connection," GRB session, Cospar, Montreal, Canada, June 2008.
Gandolfi, S., Quantum Monte Carlo Calculation of Neutron and Nuclear Matter, and of Properties of Neutron Drops, TRIUMF, Vancouver, Canada, December 8, 2009.

Gibson, B.F., Concluding Remarks, International Symposium on New Facets of the Three Nucleon Force - 50 Years of the Fujita-Miyazawa Three Nucleon Force, FM 50, Tokyo, Japan, October 2007.
Gibson, B.F., Lambda-n Scattering Lengths from Radiative K^- Capture by Deuterium at Rest, 10th International Conference on Hypernuclear and Strange Particle Physics, Tokai, Japan, September 2008.
Gibson, B.F., Lambda-n Scattering Lengths from Radiative Kaon Capture, International Workshop on Nuclear Physics at J-PARC, Tokai, Japan, June 2007.
Gibson, B.F., Lambda-neutron Scattering Lengths from Radiative Kaon Capture by Deuterium at Rest, RIKEN Workshop on Strangeness Physics, Wako, Japan, December 2008.
Gibson, B.F., Summary: A View of the Future of Strangeness Physics, International Symposium on Strangeness in Nuclear and Hadronic Systems, SENDAI08, Sendai, Japan, December 2008.
Gibson, B.F., The 2H Electric Dipole Moment in a Separable Potential Approach, 19th International Conference on Few-Body Problems in Physics, Bonn, Germany, August-September 2009.
Goldman, T., A Possible Connection Between Massive Fermions and Dark Energy, DARK 2009, 7th International Heidelberg Conference on Dark Matter in Astro and Particle Physics, Christchurch, New Zealand, January 18-24, 2009.
Goldman, T., A Possible Connection between Massive Fermions and Dark Energy, Seventh International Heidelberg Conference on Dark Matter in Astro and Particle Physics, Christchurch, New Zealand, January 18-24, 2009.
Goldman, T., All Fermions Are Vile, Neutrino 2008, Christchurch, New Zealand, May 25-31, 2008.
Goldman, T., An Atomic View of Spin and Angular Momentum in Hadrons, GHP 2009, 3rd Workshop of the APS Topical Group in Hadron Physics, Denver, CO, April 29-May 1, 2009.
Goldman, T., Peregrinations in Neutrino Masses and Mixings, INFO'07, Santa Fe, NM, July 2007.
Goldman, T., Stephenson, G.J., Alsing, P.M., McKellar, B.H.J, Proceedings of Dark Side of the Universe, Epoch Dependent Dark Energy, 5th International Workshop on the Dark Side of the Universe.
Goldman, T., Stephenson, G.J., McKellar, B.H.J, Proceedings of Dark 2009, All Fundamental Fermion Masses Are Vile, 7th International Heidelberg Conference on Dark Matter in Astro and Particle Physics.
Goldman, T., Stephenson, G.J., McKellar, B.H.J, Proceedings of Dark 2009, A Possible Connection Between Fermion Mass and Dark Energy, 7th International Heidelberg Conference on Dark Matter in Astro and Particle Physics.
Goldman, T., The Renormalization of Juan Perez-Mercader, Madrid Astrobiology Symposium, Madrid, Spain, June 10, 2008.
Graesser, M.L., Broadening the Higgs Boson with Right-Handed Neutrinos and Higher Dimension Operators, University of California at Los Angeles, Los Angeles, CA, January 23, 2007.
Graesser, M.L., Broadening the Higgs Boson with Right-Handed Neutrinos and Higher Dimension Operators, Los Alamos National Laboratory, Los Alamos, NM, February 2, 2007.
Graesser, M.L., Broadening the Higgs Boson with Right-Handed Neutrinos and Higher Dimension Operators, University of Texas, Austin, TX, February 21, 2007.
Graesser, M.L., Broadening the Higgs Boson with Right-Handed Neutrinos and Higher Dimension Operators, Princeton University, Princeton, March 15, 2007.
Graesser, M.L., Broadening the Higgs Boson with Right-Handed Neutrinos and Higher Dimension Operators, University of California San Diego, San Diego, CA, April 6, 2007.
Graesser, M.L., Conformal Field Theories and Unparticles, University of California at Los Angeles, Los Angeles, CA, May 18, 2007.
Graesser, M.L., Correlations in Supersymmetric Cascade Decays, University of Michigan, Ann Arbor, MI, January 2008.
Graesser, M.L., Higgsinoless Supersymmetry, UC Berkeley, Berkeley, CA, November 16, 2009.
Graesser, M.L., Higgsinoless Supersymmetry, UC Davis, Davis, CA, November 17, 2009.
Graesser, M.L., Probing Supersymmetry Using Third Generation Fermions, Northeastern University, Boston, MA, June 2009.
Graesser, M.L., Supersymmetric Correlations in Cascade Decays, Brookhaven Forum, Brookhaven, November 2008.
Graesser, M.L., Supersymmetric Correlations in Cascade Decays, CERN, March 20, 2008.
Graesser, M.L., Supersymmetric Correlations in Cascade Decays, University of New Mexico, Albuquerque, NM, February 19, 2008.

Grim, G. P., P. A. Bradley, et al. Prompt Radiochemistry At The National Ignition Facility (Invited) - Art. No. 10E503. 17th Topical Conference On High-Temperature Plasma Diagnostics ; 2008 ; Albuquerque, NM, CIRCULATION & FULFILLMENT DIV, 2 HUNTINGTON QUADRANGLE, STE 1 N O 1, MELVILLE, NY 11747-4501 USA, AMER INST PHYSICS.
Guiseppe, V. "The MAJORANA Neutrinoless Double-beta Decay Experiment," 2008 IEEE Nuclear Symposium, Dresden, Germany, October 2008.
Guo, L., "Cascade spectroscopy at Jefferson Lab", Jefferson Lab Science and Technology Review, Newport News, VA, June, 2008
Gupta, R., Equation of State and the Finite Temperature Transition in QCD, 2009 DPF Meeting, Detroit, MI, July 27-31, 2009.
Gupta, R., Equation of State and the finite temperature transition in QCD, Third Joint Meeting of the Nuclear Physics Division of the American Physical Society and The Physical Society of Japan, Waikoloa, HI, October 13-19, 2009.
Gupta, R., The QCD transition temperature from simulations on BlueGene L Supercomputer at LLNL, QCD in extreme conditions, Rome, Italy, August 2007.
Guzik, J.A., "Problems for the Standard Solar Model Arising from the New Solar Mixture," 21st Century Challenges For Stellar Evolution, Cefalu, Sicily, Italy, August 29-September 2, 2007, Proceedings in Mem. SA.It., Vol. 79, ed. S. Cassisi and M. Salaris, p. 481.
Guzik, J.A., "Recent Advances in Modeling Stellar Interiors", High Energy Density Laboratory Astrophysics Conference, Pasadena, CA, March 15-18, 2010.
Guzik, J.A., "Summary: Interpretations of Asteroseismic Data," HELAS Workshop, Wroclaw, Poland, June 21-27, 2008, Proceedings LA-UR-08-06129, CoAst, 157, 279-284 (2008).
Guzik, J.A., "The Solar Abundance Problem", High Energy Density Laboratory Plasma ReNEW Workshop, Rockville, MD, November 15-18, 2009.
Habib, S., Cosmic Calibration, Aspen Summer Workshop, Aspen, CO, June 2007.
Habib, S., Cosmic Calibration, Aspen Winter Workshop, Aspen, CO, January 2008.
Habib, S., Cosmological Simulations at the Petascale, IDIES Inaugural Symposium, Johns Hopkins University, Baltimore, MD, August 25-26, 2009.
Habib, S., Cosmological Simulations at the Petascale, Inaugural Symposium, Johns Hopkins University, Baltimore, MD, August 25-26, 2009.
Habib, S., Cosmological Simulations: Modeling the Universe, Santa Fe Cosmology Workshop, Santa Fe, NM, July-August 2009.
Habib, S., Dark Matter, Public Colloquium, Virginia Air and Space Center, Hampton, CT, February 10, 2009.
Habib, S., Hybrid Petacomputing Meets Cosmology: The Roadrunner Universe Project, International Computational Accelerator Physics Conference, San Francisco, CA, August 31-September 4, 2009.
Habib, S., Hybrid Petacomputing Meets Cosmology: The Roadrunner Universe Project, SciDAC 2009 Workshop, San Diego, CA, June 14-18, 2009.
Habib, S., Meeting the Precision Cosmology Challenge, SNOWPAC 2009, Snowbird, UT, February 2009.
Habib, S., Next-Generation Cosmology: Is Theory Up to the Task?, UNM Physics and Astronomy Seminar, Albuquerque, NM, May 4, 2009.
Habib, S., Percolation and the Large Scale Structure of the Universe, Department of Astronomy Seminar, Berkeley, CA, March 10, 2009.
Habib, S., Percolation and the Large Scale Structure of the Universe, Cosmic Cartography, Chicago, IL, December 2007.
Habib, S., Percolation and the Large Scale Structure of the Universe, Physics Department Seminar, University of California, Davis, November 2007.
Habib, S., Petascale Cosmology Simulations: The Roadrunner Universe Project, Los Alamos Computer Science Symposium 2008, Santa Fe, NM, October 14-15, 2008.
Habib, S., Planning Simulations for Next-Generation Surveys, Aspen Workshop on Wide-Fast-Deep Surveys, New Astrophysics Frontier, Aspen, CO, June 14-July 5, 2009.
Habib, S., Precision Computation of the Dark Matter Halo Mass Function and its Evolution, Aspen Winter Workshop, Aspen, CO, February 2007.
Habib, S., Precision Cosmology and the Dark Universe Challenge, Santa Fe Institute Colloquium, Santa Fe, NM, August 2008.

Habib, S., Precision Cosmology: Supercomputing the Dark Universe, LANL Institutes Summer Colloquium, Los Alamos, NM, July 22, 2008.
Habib, S., The Dark Universe Challenge, NASA Langley Colloquium, Hampton, CT, February 10, 2009.
Habib, S., The Dark Universe Challenge, Physics and Astronomy Colloquium, University of Minnesota, Minneapolis, MN, October 29, 2008.
Habib, S., The Dark Universe Challenge: Is Theory Up to the Task?, HEP Colloquium, Argonne National Laboratory, Argonne, IL, December 10, 2009.
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Habib, S., The Dark Universe: Mysteries and Revelations, LANL Frontier in Science Lecture Series, Albuquerque, Santa Fe, Espanola, and Los Alamos, NM, September 2007.
Haight, R., Gas Production by Fast Neutrons for Assessing Radiation Damage, American Chemical Society, New Orleans, LA, April 6, 2008.
Haight, R., Hill, T., Experimental Nuclear Data Research at the Los Alamos Neutron Science Center, 16th Pacific Basin Nuclear Conference, Aomori, Japan, May 2008.
Haight, R., Noda, S. Nelson, R., O'Donnell, J., Devlin, M., Fission Neutron Spectra Measurement at LANSCE-Status and Plans, 4th International Workshop on Nuclear Fission and Fission-Product Spectroscopy, Saint Paul-lez-Durance, France, May 13, 2009.
Haight, R., Nuclear Data Research at LANSCE, Seminar at the Svedberg Laboratory, Uppsala, Sweden, February, 2008.
Haight, R., Prompt Fission Neutron Measurements at FIGARO, LANL-LLNL Fission Workshop, Los Alamos, NM, USA, February 3, 2009.
Haight, R., Vieira, D., Improving the Nuclear Data Base for Non-Proliferation and Homeland Security, International Conference on Mathematics, Computational Methods and Reactor Physics, Saratoga Springs, NY, May 3, 2009
Hale, G.M., Covariances from Light-Element R-Matrix Analyses, Workshop on Neutron Cross Section Covariances, Port Jefferson, NY, June 24-28, 2008.
Hale, G.M., R-Matrix Analysis in the A=3-5 System and 3N Interactions, TRIUMF Workshop on Three-Nucleon Interactions from Few- to Many-Body Systems, Vancouver, Canada, March.
Hale, G.M., R-Matrix Description of the 4He System and Parity Violation, Parity Violation Workshop, Madison, WI, June 30-July 1, 2008.
Hale, G.M., TN Data and Covariances from Light-Element R-Matrix Analyses, Joint Meeting of the Interlaboratory Working Group (ILWOG 41) and Nuclear Data Workshop (NDW 4), Atomic Weapons Establishment (AWE), Aldermaston, UK, September 2008.
Hale, G.M., Using R-Matrix Theory to Obtain and Analyze Astrophysical Data, AZURE Workshop on R-Matrix and Nuclear Reactions in Stellar Burning, Santa Fe, NM, April 2008.
Hayes, A.C., Diagnosing Mix in NIF Capsules Using Radiochemistry, ILWOG, AWE, Aldermaston, United Kingdom, September 2008.
Hayes, A.C., Electron Scattering Form Factors in the No Core Shell Model, Institute for Nuclear Theory, University of Washington, Seattle, WA, June 2007.
Hayes, A.C., Extreme Computing needs for Applied Nuclear Physics, Scientific Grand Challenges for National Security: the Role of Computing at the Extreme Scale, Washington, DC, October 2009.
Hayes, A.C., Feasibility of Probing Nuclear Astrophysics at NIF, Workshop on Nuclear Astrophysics at NIF, Livermore, CA, August 2007.
Hayes, A.C., Feasibility of Using Antineutrino Monitoring for Reactors, Neutrinos for National Security Workshop, Maui, HI, March 2009.
Hayes, A.C., Implications of Improved Short Range Correlation Functions, Workshop on Parity Violation in Few Nucleon System, Madison, WI, July 2008.
Hayes, A.C., Mix Diagnostic for the National Ignition Facility, ILWOG, AWE, Livermore, CA, April 2007.
Hayes, A.C., Need for A National Tritium Beam Facility, Applications working Group, HRIBF Users Group Meeting, Oak Ridge, TN, November 2009.
Hayes, A.C., New Diagnostic for Mix at NIF, NEDPC, for the Beta Mix Collaboration, Los Alamos, NM, October 2007.

Hayes, A.C., Nuclear Physics for National Security, Physics Colloquium, University of Minnesota, Minneapolis, MN, December 2008.
Hayes, A.C., Nuclear Physics for Nuclear Energy and National Security, Workshop on Statistical Nuclear Physics and Applications in Astrophysics and Technology, Athens, OH, July 2008.
Hayes, A.C., Sign Problem with SU(3) and Simplistic Amplitudes in the No-core Shell Model Wavefunction, Workshop on Symmetries in the Nuclear Shell Model, Baton Rouge, LA, February 2009.
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Heitmann, K., "Computational Cosmology: The Quest for Precision," Cosmology Seminar, UC Davis, May 2007.
Heitmann, K., "Cosmic Clues on Dark Energy," Physics Colloquium, University of New Mexico, September 2008.
Heitmann, K., "Dark Matter Halos, Mass Functions, and Cosmology: A Theorist's View," UC Berkeley, April 2008.
Heitmann, K., "Great Cosmological Structure Simulations and the Dark Universe, Great Surveys Workshop," Santa Fe, NM, November 2008.
Heitmann, K., "Large Scale Structures and their Evolution in the Universe," ISUV Workshop on Feature Extraction and Tracking, UC Davis, August 2007.
Heitmann, K., "The Coyote Universe," Santa Fe Cosmology Workshop, Santa Fe, NM, July 2009.
Heitmann, K., "The Coyote Universe: Precision Simulations of the Large Scale Structure Distribution," LBNL Physics Colloquium, May 2009.
Hime, A. "A DEAP and CLEAN Program for Direct Detection of Dark Matter," American Physical Society April Meeting, Denver, CO, May 2009.
Hime, A. "A DEAP and CLEAN Program for the Direct Detection of Dark Matter," 238th American Chemical Society National Meeting, Washington, D.C., August 2009.
Holz, D.E., A Tour of the Universe, public lecture, Rio Grande Vista Library, Eldorado, Santa Fe, NM, June 10, 2009.
Holz, D.E., Cosmology from Gravitational-wave Standard Sirens, Amaldi Meeting, Columbia University, New York, NY, June 22, 2009.
Holz, D.E., Cosmology from Gravitational-wave Standard Sirens, Astrophysics Seminar, McGill, Montreal, Canada, October 7, 2008.
Holz, D.E., Cosmology from Gravitational-wave Standard Sirens, Caltech Physics Colloquium, Pasadena, CA, November 12, 2009.
Holz, D.E., Cosmology from Gravitational-wave Standard Sirens, Galileo Galilei Institute, Florence, Italy, March 2, 2009.
Holz, D.E., Cosmology from Gravitational-wave Standard Sirens, Kavli Colloquium, KICP, University of Chicago, Chicago, IL, US, December 8, 2008.
Holz, D.E., Cosmology from Gravitational-Wave Standard Sirens, OSU astrophysics seminar, Columbus, OH, May 6, 2008.
Holz, D.E., Cosmology from Gravitational-wave Standard Sirens, Steward/NOAO/NRAO Joint Colloquium Series, University of Arizona, October 1, 2009.
Holz, D.E., Cosmology from Gravitational-Waves, The astrophysics of near-term cosmological observations Workshop, Waterloo, Canada, November 28-30, 2007.
Holz, D.E., Cosmology from Standard Sirens, Astrophysics Seminar, IAS, Princeton University, Princeton, NJ, April 17, 2008.
Holz, D.E., Gravitational Waves and Cosmology, INPA Seminar, LBL, Berkeley, CA, August 3, 2007.
Holz, D.E., GW Standard Sirens and Cosmology, PONT d'Avignon 2008, Avignon, France, April 25, 2008.
Holz, D.E., LIGO: Standard Sirens and Cosmology, GR18/Amaldi meeting, Sydney, Australia, July 13, 2007.
Holz, D.E., LISA: Standard Sirens and Cosmology, GR18/Amaldi meeting, Sydney, Australia, July 12, 2007.
Holz, D.E., Plenary Talk: SNAP, 2nd International Workshop on the Interconnection Between Particle Physics and Cosmology, Albuquerque, NM, May 19-23, 2008.

Holz, D.E., Standard Sirens and Cosmology, CITA astrophysics seminar, Toronto, Canada, November 26, 2007.
Holz, D.E., Standard Sirens, Gravitational Lensing, and Cosmo, Milwaukee Gravity Seminar, Milwaukee, WI, April 27, 2007.
Holz, D.E., Supernova Lensing Statistics, SNAP Collaboration Meeting, LBL, Berkeley, CA, January 18, 2007.
Hungerford, Aimee, IMC Simulations of Asymmetric Supernovae, Workshop for Computational Methods in Radiation Transport Granlibakken Resport, Lake Tahoe, NV, September 2008.
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Jiang, X. , "Semi-Inclusive DIS Experiments at Jefferson Lab with a 6 GeV and 1 GeV Electron Beam", The 18th International Symposium on Spin Physics, Charlottesville, VA, October 2008.
Jiang, X. "Accessing quark information through semi-inclusive deep-inelastic scattering reactions at JLab-12 GeV". Workshop of hadronic physics in China and Jefferson Lab-12 GeV upgrade, OCPCA-6, Lanzhou, China. July 2009.
Jiang, X. "Measurements of semi-inclusive deep-inelastic scattering cross sections at JLab-12 GeV", INT-Workshop of Jefferson Lab-12 GeV upgrade, Seattle, WA, September 2009.
Jiang, X., "Semi-Inclusive DIS Experiments at Jefferson Lab with a 6 GeV and 11 GeV Electron Beam", The 18th International Symposium on Spin Physics, Charlottesville, VA, October 2008.
Jiang, X.,"Transversity and TMD measurements at Jefferson Lab HALL-A and HALL-C", Second International Workshop on Transverse Polarization Phenomena in Hard Processes, Ferrara, Italy, June 2008.
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Kahler, A.C., ENDF/B-VII Data Testing with ICSB EP Benchmarks, International Conference on Nuclear Science and Technology, Nice, France, April 22-27, 2007.
Kahler, A.C., The NJOY Nuclear Data Processing System - Current Status and Future Plans, NEA Workshop on Processing Tools for Evaluated Nuclear Data Libraries, Paris, France, November 18, 2008.
Kapustinsky, J., "The Forward Silicon Vertex Tracker Upgrade for the PHENIX Experiment at RHIC," IEEE-Nuclear Science Symposium and Medical Imaging Conference, Dresden, Germany, October 21, 2008.
Kapustinsky, J.S., "The Forward Silicon Vertex Tracker Upgrade for PHENIX at RHIC", 16th International Workshop on Vertex detectors, Lake Placid, NY, September 23-28, 2007.
Kawano, T., Neutron Capture of Deformed Nuclei, Workshop on Statistical Nuclear Physics and Applications in Astrophysics and Technology, SNP 2008, Athens, OH, July 2008.
Kawano, T., Nuclear Reaction Data for Nuclear Technologies and Applications Compound-Nuclear Reactions and Related Topics, CNR 2007, Fishcamp, CA, October 22-26, 2007.
Kawano, T., Statistical-Model and Direct-Semidirect-Model Calculations of Neutron Radiative Capture Process, New Era of Nuclear Physics in the Cosmos, the r-process Nucleon-Synthesis, Wako, Japan, September 25-26, 2008.
Kippen, R. M, "GBM Simulations and Instrument Response," Max-Planck Institute for Extraterrestrial Physics, Garching, Germany, April 2008.
Kippen, R. M., "Celestial Navigation using Cosmic X-ray Sources," AFRL/LANL Focused Long-term Challenge Partnership Workshop, Albuquerque, NM, August 2007.
Kippen, R. M., "GEANT4 Tools for High-energy Astrophysics Instrumentation," 5th GEANT4 Space Users' Workshop, Tokyo, Japan, February 2008.
Kippen, R. M.,"Los Alamos National Laboratory Space and Sensor Capabilities," Lockheed-Martin Corporation Sunnyvale, CA, June 2008.

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Leitch, M. J., "Quarkonia Production in p+p, p+A and A+A Collisions," Quarkonium in Hot Media: from QCD to Experiment Workshop, INT, Seattle, June 16-26 2009.
Leitch, M., "Scientific Opportunities in pA & dA Collisions, " NSAC Long Range Plan Town Hall, Rutgers, January 2007.
Leitch, M.J, (for the PHENIX Collaboration), "Open Heavy Quarks from PHENIX", UCLA Workshop on Heavy Quarks, January 22-24, 2009.
Leitch, M.J, (for the PHENIX Collaboration), "PHENIX Highlights I – Initial State and Early Times", Quark Matter 2009, Knoxville, TN, March 30, 2009.
Leitch, M.J, (for the PHENIX Collaboration), "Quarkonia Results from PHENIX", UCLA Workshop on Heavy Quarks, January 22-24, 2009.
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Leitch, M.J., (for the PHENIX Collaboration), "Open Heavy Quarks from PHENIX", UCLA Workshop on Heavy Quarks, January 22-24, 2009.
Leitch, M.J., (for the PHENIX Collaboration), "Quarkonia Measurements at PHENIX", RBRC Workshop on Understanding QGP through Spectral Functions and Eudlidean Correlators," BNL, April 23-25, 2008.
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Leitch, M.J., "Quarkonia Results from PHENIX and STAR", RHIC/AGS Users Meeting, Workshop on Charm and Beauty school: "What heavy quarks can tell us about the sQGP", BNL, May 27, 2008.
Leitch, M.J., "What we have Learned from d+Au Collisions at RHIC", High Energy Hadron Physics with Hadron Beams Workshop, KEK, Tsukuba, Japan, January 6-8, 2010.
Leitch, M.J., "What we have Learned from the RHIC d+Au Program", Workshop on Investigation of Glue and the Physics and Prospects of the EIC, DNP/JPS Meeting, Hawaii, October 13, 2009.
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Li, H., AGN and Magnetic Fields in Galaxy Clusters, National Radio Astronomy Observatory, NM, September 11, 2009.
Li, H., AGN Feedback and Magnetic Fields in Galaxy Clusters, Department Colloquium, University of New Mexico, Albuquerque, NM, March 23, 2009.
Li, H., AGN Feedback and Magnetic Fields in Galaxy Clusters, The Third East-Asia Numerical Astrophysics Meeting, NanJing, China, November 2008.
Li, H., Astrophysical Jets, Center for Magnetic Self-Organization Meeting on Momentum Transport, Chicago, IL, February 26-28, 2007.
Li, H., Astrophysical Jets, Department Colloquium, UC-Irvine, Irvine, CA, October 24, 2007.
Li, H., Collisionless Physics in Astrophysical Jets, Workshop on Relativistic Collisionless Plasma Astrophysics, Rice University, Houston, TX, May 14-16, 2007.
Li, H., Dissipation and Spectral Energy Transfer in the Relaxation of 3-D Force-Free Magnetic Sheet Pinch, Joint Institute for Fusion Theory Workshop on Gyrokinetic Simulation of Ion and Electron Temperature Gradient-Driven Transport: Physics Mechanisms Behind the Transport Coefficient, San Diego, CA, January 2007.
Li, H., Large Scale Structure of Magnetically Dominated Astrophysical Jets, Momentum Transport in Jets, Disks and Laboratory Plasmas, Alba, Italy, September 27-29, 2007.
Li, H., Magnetic Fields in Galaxy Clusters, Center for Magnetic Self-Organization Meeting, Santa Fe, NM, April 2009.
Li, H., Magnetic Jets and Lobes in Astrophysics and Laboratory, 212th AAS meeting, St. Louis, MO, June 2008.

Li, H., Magnetic Jets and Lobes in Astrophysics and Laboratory, Department Colloquium, Caltech, Pasadena, CA, March 2, 2009.
Li, H., MHD Turbulence, Dynamo and the Origin of Magnetic Fields in Galaxy Clusters, Colloquium at Shanghai Astronomical Observatory, Shanghai, China, July 13, 2009.
Li, H., Physics of Astrophysical Jets: Observations and Simulations, First Asian-Pacific Symposium on Astrophysical, Space and Laboratory Plasmas, Beijing, China, June 18-21, 2007.
Li, H., Plasma Astrophysics, Colloquium at Kavli Institute of Astronomy and Astrophysics, Beijing, China, November 14, 2008.
Li, H., Vortices in Disks and Proto-Planet Migration, Department Colloquium, Rice University, Houston, TX, December 5, 2007.
Liu, Chen-Yu., Investigation of New Approaches to Ultra-cold Neutron Production at IUCF 3rd Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan, October 13-17, 2009
Liu, H. "Recent Transverse Spin Results in Polarized p+p Collisions at PHENIX", 2008 RHIC & AGS Annual Users' Meeting, Brookhaven National Laboratory, May 27-30, 2008.
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Liu, H., "Transverse Single Spin Asymmetry in Heavy Flavor Production in Polarized p+p Collisions at RHIC", PKU-RBRC Workshop on Transverse Spin Physics, June 30-July 4, 2008.
Liu, H., "Transverse Single Spin Asymmetry in Heavy Flavor Production in Polarized p+p Collisions at PHENIX", 18th International Symposium on Spin Physics, Charlottesville, VA, October 2008.
Liu, M. "Probing Gluon Polarization with Heavy Flavor Production at RHIC", Spin2006 Kyoto, Japan, October 2006
Liu, M., "A Study of quark energy loss in p+A Collisions in the E906 at Fermilab", Quark Matter 2009, Knoxville, TN, April 2009.
Liu, M., "Future Transverse Single Spin Drell-Yan Measurements at RHIC", J-Lab Upgrade Workshop, Lanzhou, China, September 2009.
Liu, M., "Overview of RHIC-SPIN Program", OCPA6, Lanzhou, China, September 2009.
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Liu, M.,"Overview of the PHENIX Transverse Spin Physics Program at RHIC", Circum-Pan-Pacific Symposium on High Energy Spin Physics, Vancouver, Canada, July 2007
Liu, W., 3D Magnetic Reconnection of Relativistic Pair Plasmas, 51st APS-DPP annual meeting, Atlanta, GA, November 2009.
Liu, W., 3D Magnetic Reconnection of Relativistic Pair Plasmas, OCPA6 Annual Meeting, Lanzhou, China, August 2009.
Liu, W., Axisymmetric Numerical and Analytical Studies of the Helical Magnetorotational Instability in a Magnetized Taylor-Couette Flow, 49th APS-DPP annual meeting, Orlando, FL, November 2007.
Liu, W., Center of Nonlinear Studies Seminar, Los Alamos National Laboratory, September 2008.
Liu, W., Computational Studies of Magnetic Bubble Expansion as a Model for Extra-galactic Radio Lobes in Galaxy Clusters, CMSO General Meeting, Santa Fe, NM, April 2009.
Liu, W., Department of Physics and Astronomy Seminar, University of California at Irvine, March 2009.
Liu, W., Department of Physics and Science Technology Seminar, Princeton Plasma Physics Laboratory, August 2009.
Liu, W., Institute of Fusion Theory and Simulation Seminar, Zhejiang University, July 2009.
Liu, W., University Forum, Suzhou University, August 2009.
Louis, W.C., MiniBooNE Neutrino Oscillation Results, American Chemical Society National Meeting, Washington, D.C., August 16-20, 2009.
Louis, W.C., MiniBooNE Oscillation Results, INFO 09 Workshop, Santa Fe, NM, July 6-10, 2009.
Louis, W.C., MiniBooNE Results and Follow-On Experiments, Thirteenth International Workshop on Neutrino Telescopes, Venice, Italy, March 10-13, 2009.
Lukic, Z., Dark Matter Halo Structure, Santa Fe Cosmology Workshop, Santa Fe, NM, July 2009.
Lukic, Z., Formation of Structure in the Universe, Astrophysics Colloquium, University of Belgrade, Belgrade, Serbia, September 2008.

Lukic, Z., Structure Formation and Cosmological Parameters, Institute of Physics Colloquium, Belgrade, Serbia, September 2008.
MacFarlane, R.E., Critical Assembly Analysis, Joint LANL-LLNL Fission Product Review Panel, Livermore, CA, November 4, 2009.
MacFarlane, R.E., ENDF/B-VII Energy Balance, Cross Section Evaluation Working Group, Brookhaven, NY, November 2007.
Makela, M., "The Ultracold Neutron Source at LANSCE," 8th LANSCE User Group Meeting, Santa Fe, NM, June 10-12, 2007.
Makela, M., "The Ultracold Neutron Source at LANSCE," International Workshop on Ultracold Neutron Sources and Experiments, September 13-14, 2007, TRIUMF, Vancouver, BC, Canada
Makela, M., High Precision Measurements of Neutron Beta-Decay at LANSCE, American Physical Society, 3rd Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan, October 13-17, 2009.
Mauger, C., Les Recontres de Physique de la Vallee d'Aoste, La Thuile, Italy, March 4-10, 2007.
Mauger, C., Long-Baseline Neutrino Experiment, Aspen Particle Physics Conference, Aspen, CO, January 17-23, 2010.
Mauger, C., Recent Results from MiniBooNE and the Future Project LBNE, Miami, FL, December 15-20, 2009.
McGaughey, P., "A fresh perspective on cold nuclear matter effects," PHENIX Forward Upgrade Meeting, Santa Fe, NM, May 15, 2007.
Mills, G.B., A Near Detector for MiniBooNE, INFO 09 Workshop, Santa Fe, NM, July 6-10, 2009.
Mills, G.B., MiniBooNE Neutrino Oscillation Results, Summer Program of the Aspen Center for Physics, Aspen, CO, June 28-July 5, 2009.
Moller, P., Charge And Neutron Radii And Densities In The Macroscopic-Microscopic Approach: What Predictive Power?, International Workshop on The Lead Radius Experiment and Neutron Rich Matter in Astrophysics and in the Laboratory, Trento, Italy, August 2009.
Moller, P., FRDM Mass Model/Triaxial Degrees of Freedom in the Macroscopic-Microscopic Approach, Presentation at the Mass Olympics, Trento, Italy, May 26-30, 2008.
Moller, P., Global Calculations of Nuclear Structure Properties, Defining the Neutron Star Crust: X-ray Bursts, Superbursts and Giant Flares, Santa Fe, NM, May 18-21, 2009.
Moller, P., Large-Scale Calculations of Nuclear-Structure Data for Simulation Data Bases, First Carina-Jina Collaboration Meeting on Nuclear Physics Data Compilation for Neucleosynthesis Modeling, Trento, Italy, May-June 29-1, 2007.
Moller, P., My Journey to the Superheavy Island with Szymanski, Nilsson, Nix, and Swiatecki: from Lysekil to the Present, 16th Nuclear Physics Workshop, Kazimierz Dolny, Poland, September 23-27, 2009.
Moller, P., New Fission Barrier Calculation, USNDP Annual Meeting, Brookhaven, NY, November 2008.
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Moller, P., Nuclear Masses, SciDAC Workshop, Pack Forest, WA, August 14, 2007.
Moller, P., Nuclear Reactions on Americium, Fission Barriers, NRAm2007, Santa Fe, NM, September 18-20, 2007.
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Mottola, E., Beyond HTL's: Resummation in Equilibrium and Non-Equilibrium Gauge Theories, University of California, Kavli Institute for Theoretical Physics Seminar, Santa Barbara, CA, February 20, 2008.
Mottola, E., Black Holes, Dark Energy & Condensate Stars, Institute d'Astrophysique de Paris, Paris, France, May 2009.
Mottola, E., Black Holes, Dark Energy & Condensate Stars, Univ. of Geneva Seminar, Geneva, Switzerland, November 20, 2009.

Mottola, E., Black Holes, Dark Energy & Condensate Stars: Macroscopic Effects of the Quantum Trace Anomaly, CERN Seminar, Geneva, Switzerland, November 11, 2009.
Mottola, E., Cosmological Dark Energy: Prospects for a Dynamical Theory, Virtual Institute of Astroparticle Physics, Paris, France, April 11, 2008.
Mottola, E., Cosmological Dark Energy: Prospects for a Dynamical Theory, ENRAGeing Ideas, Utrecht, Netherlands, September 2007.
Mottola, E., Gravitational Condensate Stars: An Alternative to Black Holes, Eotvos University, Budapest, Seminar, Budapest, Hungry, September 2007.
Mottola, E., Hard Thermal Loops and Soft Physics, Stony Brook University Seminar, Stony Brook, NY, August 2009.
Mottola, E., Infrared Quantum Effects in de Sitter Space, University of California, Kavli Institute for Theoretical Physics Seminar, Santa Barbara, CA, May 14, 2008.
Mottola, E., Macroscopic Effects of the Quantum Trace Anomaly, Condensed Matter Meets Gravity, Leiden, Netherlands, September 2007.
Mottola, E., Macroscopic Effects of the Quantum Trace AnomalyThe Trace Anomaly and Dynamical Vacuum Energy in Cosmology (Plenary Talk), University of Maryland Seminar, College Park, MD, September 1, 2009.
Mottola, E., Systematics of High Temperature Perturbation Theory, Institute de Physique Theorique, Saclay, France, May 2009.
Mottola, E., Systematics of High Temperature Perturbation Theory: Hard Thermal Loops & The Two-Loop Electron Self-Energy in QED, Brookhaven National Laboratory Seminar, Brookhaven, NY, August 2009.
Mottola, E., The Trace Anomaly and Dynamical Vacuum Energy in Cosmology, University of Geneva Seminar, Geneva, Switzerland, November 27, 2009.
Mottola, E., The Trace Anomaly and Dynamical Vacuum Energy in Cosmology (Plenary Talk), Ninth Conference on Quantum Field theory Under the Influence of External Conditions, Norman, OK, September 21-25, 2009.
Mottola, E., The Trace Anomaly and Dynamical Vacuum Energy in Cosmology, Lawrence Berkeley National Laboratory Seminar, Berkeley, CA, June 2008.
Mottola, E., The Trace Anomaly and Emergent Gravity, Emergent Gravity Workshop, Cambridge, MA, August 2008.
Mottola, E., The Trace Anomaly and Massless Scalar Degrees of Freedom in Gravity, 4th Intl. Sakharov Conference on Physics, Moscow, Russia, May 18-23, 2009.
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Plesko, C. S., "Hydrocode Models of Large Impacts into a Noachian Martian Surface: Initial Results," Proc. 39th LPSC, 2008.

Plesko, C. S., "Validation of the RAGE Hydrocode for Impact Modeling," Proc. 38th LPSC, 2007.
Pope, A., "Developing a New Cosmological N-body Code for Cell Supercomputers, Path to Petascale," National Center for Supercomputing Applications, UIUC, Urbana, Illinois, April 2009.
Puckett, A., "GEp-III Analysis Update" Jefferson Lab Hall C Users Meeting, January 2010.
Reddy, S., An Introduction to Neutron Stars and Neutron-rich Matter, Thomas Jefferson Laboratory Workshop on Lead Radius Experiment, Newport News, VA, August 2008.
Reddy, S., Birth of Compact Stars: Supernova and Protoneutron Star Evolution, 44th Karpacz Winter School of Theoretical Physics, Wroclaw, Poland, February 2008.
Reddy, S., Dense Matter and its Role in Neutron Star Structure and Evolution, Gordon Research Conference in Nuclear Physics, Newport, RI, July 2007.
Reddy, S., Explosive Phenomena on Neutron Stars, Workshop on Computational Astrophysics, Palo Alto, CA, April 2008.
Reddy, S., Fermion Superfluids: From Cold Atoms to Neutron Stars, Cracow School of Theoretical Physics, Zakopane, Poland, June 2007.
Reddy, S., From Nuclei to Neutron Stars, Plenary Talk, DNP Meeting, Newport News, VA, October 2007.
Reddy, S., Inside Neutron Stars: Theoretical Speculations & Observational Constraints, Physics Society Colloquium, McGill Univ., Quebec, Canada, October 2008.
Reddy, S., Mining Neutron Stars for New States of Matter, Physics Department Colloquium, Montana State University, Bozeman, MT, October 2008.
Reddy, S., Neutrino Rates in Dense Superfluids, 40 years of Pulsars, Montreal, Canada, August 2007.
Reddy, S., Strange Star Crusts and First Order Phase Transitions, Compstar Winter School on Compact Stars, Coimbra, Portugal, February 2009.
Reddy, S., Superfluid Heat Conduction in Neutron Stars, Mini-workshop on Neutron Stars and Neutrinos, Tucson, AZ, April 2009.
Reddy, S., Superfluid Heat Conduction in Neutron Stars, TNT Colloquium, North Carolina State University, Raleigh, NC, October 2008.
Reddy, S., Superfluid Heat Conduction in the Magnetars, Aspen 2008, Winter Conference, Aspen, CO, February 2009.
Reddy, S., Superfluid Heat Conduction in the Neutron Star Crust, ANL Workshop on the Equation of State at Nonzero Density and Temperature and its Application in Astrophysics, Argonne, IL, August 2008.
Reddy, S., Using Cosmic Explosions to Probe Fundamental Physics, Physics and Theory Colloquium, LANL, Los Alamos, NM, January 2008.
Reddy, S., Weak Interactions in Superfluids and Cooling Rate of Neutron Stars, INT Workshop on Neutron Star Crust and Surface, Seattle, WA, June 2007.
Reifarth, R., Neutron Capture Rates for S-Process Analysis, Seminar at Idaho National Laboratory, Idaho Falls, ID, February, 2007
Rielage, K. "Recent Solar Neutrino Flux Results from the Sudbury Neutrino Observatory." University of North Carolina – Chapel Hill Physics Department, Chapel Hill, NC, October 2008.
Rielage, K. "The Beginning of the End of an Era: Analysis after the shutdown of the Sudbury Neutrino Observatory," April Meeting of the American Physical Society, Jacksonville, FL, April, 2007.
Romano, C., Y. Danon, Et Al. Measurements Of (N,Alpha) Cross-Section Of Small Samples Using A Lead-Slowing-Down-Spectrometer. 7th International Conference On Accelerator Applications ; 20050828 - 20050901 ; Venice, ITALY
Rundberg, R. S., T. A. Bredeweg, Et Al. Neutron Capture Cross Sections Of U-236 And U-234. CAPTURE GAMMA-RAY SPECTROSCOPY AND RELATED TOPICS, 2 HUNTINGTON QUADRANGLE, STE 1NO1, MELVILLE, NY 11747-4501 USA, AMER INST PHYSICS.
Sharma, R., The crystallography of three flavor quark matter, Confinement08, Mainz, Germany, September 2008.
Sharma, R., The Strength of Three Flavor Quark Matter, Fundamental Problems in Hot and/or Dense QCD, Kyoto, Japan, March 2008.
Silvestre, C., "Dimuon Physics in CMS", QGP-France 2009, Etratet, France.
Sinnis, G., "Applications of Nuclear Particle Astrophysics and Cosmology at LANL", Los Alamos National Laboratory, Capability Review, May 2007.
Sinnis, G., "Cosmic-Ray and Gamma-Ray Astrophysics with Milagro", Advances in Cosmic-Ray Science, Waseda University, Tokyo, Japan, March 2008.

Sinnis, G., "Discovery of an Anomalous Component to the Local Cosmic Rays near 10 TeV", COSPAR, Montreal, Canada July 2008.
Sinnis, G., "Synoptic TeV Telescope: Recent Results and Future Plans", 30th International Cosmic Ray Conference, Merida, Mexico, July 2007.
Sinnis, G., "Synoptic VHE Gamma-Ray Telescopes: Recent Results & Future Plans", CTA Workshop, Paris, France, March 2007.
Sinnis, G., "TeV Gamma-Ray Observations with Milagro", Rome International Conference on Astroparticle Physics, Rome, Italy, June 2007.
Sinnis, G., "The Milagro Gamma-Ray Telescope: A New Look at an Old Problem", APS Four Corner Section Meeting, Golden CO, October 2009.
Sinnis, G., "Very High Energy Gamma-Ray Astronomy: The View from the Ground", COSPAR, Montreal, Canada July 2008.
Sinnis, G., "Very High Energy Gamma-Ray Astrophysics", University of New Mexico, Physics Colloquium, September 2007.
Sinnis, G., "Wide-Field Gamma-Ray Instrument: Milagro Results and Plans for HAWC", Science with the Next Generation of High Energy Gamma-Ray Experiments, Padua, Italy, 2008.
Sinnis, G., "Wide-Field Gamma-Ray Instrument: Milagro Results and Plans for HAWC", TeV Particle Astrophysics IV, Beijing, China, 2008.
Sinnis, G., Rapporteur Talk "Low Energy Cosmic Rays", 31st International Cosmic Ray Conference, Lodz, Poland, July 2009.
Snyder, J. L., M. Kavalenka, et al. Permeability And Protein Separations: Functional Studies Of Porous Nanocrystalline Silicon Membranes. NSTI NANOTECH 2008, VOL 1, TECHNICAL PROCEEDINGS : MATERIALS, FABRICATION, PARTICLES, AND CHARACTERIZATION, 6000 BROKEN SOUND PARKWAY NW, STE 300, BOCA RATON, FL 33487-2742 USA, CRC PRESS-TAYLOR & FRANCIS GROUP.
Talou, P., Fission Studies at LANL, Seminar at the Center for Nuclear Studies, Bordeaux, France, October 20, 2008.
Talou, P., Recent Advances in Nuclear Fission Theory: Pre- and Post- Scission Physics, Nuclear Data for Science and Technology, Jeju Island, Korea, April 26-30, 2010.
Torgerson, J.R "Time variaton of the Fine Structure constant and the Oklo Phenomenon," In search of variation of fundamental couplings and mass scales, Perimeter Institute for Theoretical Physics, Waterloo, Canada (July, 2008)
Torgerson, J.R. "(A couple) Searches for variation of fundamental constants with optical frequencyreferences (and a couple that don't)," National Superconducting Cyclotron Laboratory, Michigan State University (March, 2009).
Tovesson, F., Fission Cross Section Measurements in Support of the Global Nuclear Energy Partnership (GNEP), 8th LANSCE User Group Meeting, Los Alamos, NM, June 2008
Tovesson, F., LANSCE Data for Nuclear Energy, LUG 09, Santa Fe, NM, September 1, 2009.
Ullmann, J., An Overview of Fission Measurement at LANSCE, Workshop on Compound Nuclear Reactions and Related Topics, October 22, 2007.
Ullmann, J., Recent Results Using the DANCE Detector at Los Alamos, Workshop on Photon Strength Functions and Related Topics, Prague, Czech Republic, June 17, 2007.
Vieira, D. J., M. Jandel, et al. Neutron Capture And (N,2n) Measurements On Am-241. INTERNATIONAL CONFERENCE ON NUCLEAR DATA FOR SCIENCE AND TECHNOLOGY, VOL 1, PROCEEDINGS, 17 AVE DU HOGGAR PARC D ACTIVITES COUTABOEUF BP 112, F-91944 CEDEX A, FRANCE, E D P SCIENCES.
Vincenzo, V., Low-energy probes of physics beyond the Standard Model 3rd Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan, October 13–17, 2009, Abstract: CK.00001.
Vitev, I., A Brief Overview of Heavy Ion Physics, T-2 Colloquium, Los Alamos, NM, November 2008.
Vitev, I., A Light-Front Wave-Function Approach to In-Medium Modification of Heavy-Quark, Heavy Quark Physics in Nucleus-Nucleus Collisions 2009, Los Angeles, CA, January 2009.
Vitev, I., Collisional Dissociation of Heavy Mesons in Dense QCD Matter, Seminar at the Center for Nuclear Studies, Los Alamos, NM, March 2007.
Vitev, I., Collisional Dissociation of Heavy Mesons in the QGP, 2007 RHIC & AGS Users' Meeting, Upton, NY, June 2007.

Vitev, I., Hard probes physics at RHIC and the LHC: from jets to heavy quarks, Department Colloquium, UCLA, Los Angeles, CA, April 2009.
Vitev, I., Heavy-Ion Physics with CMS, CMS LHC Workshop 2009, Santa Fe, NM, April 2009.
Vitev, I., Jet Physics at the LHC, P-25 Colloquium, Los Alamos, NM, August 2007.
Vitev, I., Jet Physics in Relativistic Nuclear Collisions, Division of Particles and Fields, Detroit, MI, July 2009.
Vitev, I., Jet Physics in the LHC Era, NPAC University of New Mexico, Albuquerque, NM, January 2008.
Vitev, I., Jet Shapes and Jet Cross Sections: from Hadrons to Nuclei, Quark Matter 2009, Knoxville, TN, March 2009.
Vitev, I., Jet Shapes and Jet Cross Sections: from Hadrons to Nuclei, XXV Winter Workshop on Nuclear Dynamics, Big Sky, MO, January 2009.
Vitev, I., Jet Shapes and Jet Cross Sections: from Hadrons to Nuclei, Department Colloquium, Brookhaven National Laboratory, Brookhaven, NY, January 2009.
Vitev, I., New Approaches to Heavy Flavor Suppression in the QGP, Heavy Flavor in Heavy Ion Collisions Workshop, Heidelberg, Germany, May 2008.
Vitev, I., Novel Mechanisms of Heavy Flavor Suppression in the QGP, Hot Quarks 2008, Estes Park, CO, August 2008.
Vitev, I., Partonic Energy Loss Explained, P-25 Colloquium, Los Alamos, NM, May 2008.
Vitev, I., Predictions for the LHC: from Photons to Heavy Quarks, Last Call for LHC Predictions, Geneva, Switzerland, May 2007.
Vitev, I., Recent Developments in the Theory and Phenomenology of Heavy Ion collisions, Bulgarian Academy of Sciences, Sofia, Bulgaria, February 2008.
Vitev, I., RHIC II Physics Overview, 2007 RHIC & AGS Users' Meeting, Upton, NY, June 2007.
Vitev, I., Self-Consistency of Jet Quenching Calculations at the LHC, High pT at the LHC, Jyvaskyla, Finland, March 2007.
Vitev, I., The first precise determination of quark energy loss in nuclei, Dept. Colloquium, Rutgers University, Piscataway, NJ, April 2007.
Vitev, I., The Physics of Light Quarks, Heavy Quarks and Jets in Heavy Ion Collisions, Dept. Colloquium, Kent State Univ., Kent, OH, December 2007.
Vitev, I., The Physics of Light Quarks, Heavy Quarks and Jets in Heavy Ion Collisions, Dept. Colloquium, Wayne State Univ., Detroit, MI, November 2007.
Vitev, I., The Physics of Light Quarks, Heavy Quarks and Jets in Heavy Ion Collisions, Dept. Colloquium, Univ. of Texas at Austin, Austin, TX, October 2007.
Vitev, I., Theoretical Developments in Heavy and Light Flavour Energy Loss, Quark Matter 2008, Jaipur, India, February 2008.
Vitev, I., Theoretical Developments in Heavy and Light Flavour Energy Loss, T-16 Seminar, Los Alamos, NM, US, January 2008.
Vitev, I., Tomography of Jets: New Opportunities at the LHC, Hot and Dense Matter in the RHIC-LHC Era, Mumbai, India, February 2008.
Von Reden, K., M. Zhang, et al. Carbon Nanotube Foils For Electron Stripping In Tandem Accelerators. 19th International Conference On Application Of Accelerators In Research And Industry ; 20060820 - 20060825 ; Ft Worth, TX, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS, ELSEVIER SCIENCE BV.
Wallace, M. S., "Detectors for Nonproliferation work at Los Alamos," Meeting of the Institute for Nuclear and Particle Astrophysics and Cosmology, BNL, Berkeley, CA, May 2007.
Wangler, T. P., R. W. Garnett, et al. The RIAPMTQ/IMPACT Beam-Dynamics Simulation Package. 2007 IEEE PARTICLE ACCELERATOR CONFERENCE, VOLS 1-11, 345 E 47TH ST, NEW YORK, NY 10017 USA, IEEE.
Wangler, T. P., R. W. Garnett, et al. The RIAPMTQ/IMPACT Beam-Dynamics Simulation Package. 2007 IEEE Particle Accelerator Conference, Piscataway, NJ, USA, IEEE.
Warren, M.S., Astronomical Data Analysis with Commodity Components, International Conference for High Performance Computing, Communications and Storage, Reno, NV, November 2007.
Watanabe, T., Evaluations of Neutron Cross Sections on Prompt Fission Products, General Meeting International Agreement on Fundamental Science Supporting Stockpile Stewardship, Livermore, CA, March 31-April 2, 2009.

Watanabe, T., Proton Capture Calculations, Rutgers University SSAA Center for Excellence Presentations, Los Alamos, NM, October 29, 2009.
Wender, S., Applied Nuclear Science Research at Los Alamos Neutron Science Center, NSAC Town Meeting, Chicago, IL, January 12, 2007.
Wender, S., Los Alamos Semiconductor Testing Facility (ICEHouse), IRPS-International Reliability Physics Imposium Workshop on Nculear Bean Facilities for SEE/SEU Characterization, April 23, 2009.
Wender, S., Los Alamos SemiConductor Testing Facility, METTOP-New Mexico Tech, Socorro, NM, February 2008.
Wender, S., Nuclear Data Capabilities at Los Alamos Neutron Science Center/Weapons, Joint Meeting of Radiochemistry Interlaboratory Working Group Meeting, Aldermarston, United Kingdom, September 2008.
Wender, S., Nuclear Science Program at LANSCE: Update and the Future, 8th LANSCE User Group Meeting, Los Alamos, NM, June 2008.
Wilkerson, C., M. Mac Innes, et al. A Comparison Of Reaction Rate Calculations Using ENDF/B-VII With Critical Assembly Measurements. INTERNATIONAL CONFERENCE ON NUCLEAR DATA FOR SCIENCE AND TECHNOLOGY, VOL 2, PROCEEDINGS, 17 AVE DU HOGGAR PARC D ACTIVITES COUTABOEUF BP 112, F-91944 CEDEX A, FRANCE, E D P SCIENCES.
Wilkerson, M. P. And J. M. Berg Excitation Spectra Of Near-Infrared Photoluminescence From Np(VI) In Cs2U(Np)O2Cl4. 5th Conference On Plutonium Futures - The Science ; 20080707 - 20080711; Dijon, FRANCE
Wilkerson, M. P., C. A. Arrington, et al. Crystal Structure And Spectroscopic Measurements Of Room Temperature Intra-5f Fluorescence Of Cs2Np(VI)O2Cl4. 4th Topical Conference On Plutonium And Actinides/Plutonium Futures - The Science 2006 ; 20060709 - 20060713 ; Pacific Grove, CA
Yuly, M., Investigation of the Neutron-Induced Deuteron Breakup Process, Houghton College Star, Houghton, NY, September 2007.
Zhang, B., Jet Shapes and Cross Sections in Relativistic Heavy-ion Collisions, Third Joint Meeting of the Nuclear Physics Division of the APS and JPS, HI, October 13-17, 2007.
Zhang, B., Measuring Parton Energy Loss in Cold Nuclei E906 at, E906 Collaboration Meeting, Batavia, IL, July 2009.
Zhao, Y. H., Y. T. Zhu, et al. Influence Of Stacking Fault Energy On The Minimum Grain Size Achieved In Severe Plastic Deformation. Symposium On Processing And Mechanical Response Of Engineering Materials Held At The 2006 TMS Annual Meeting ; 20060312 - 20060316 ; San Antonio, TX

Contributed Talks to Conferences and Workshops

The following list shows 223 contributed talks to conferences and workshops. The list does not show internal meetings or reviews or academic meetings. It reflects the major international involvement of the NPAC capability area staff. The list was compiled via submissions by staff in this capability area.

Bhattacharya, S., The Effect of Electron-Ion Equilibration on the Sunyaev-Zel'dovich Effect of Galaxy Clusters, APS April Meeting, Denver, CO, May 2009.
Bhattacharya, S., Using Supernovae from a Large Imaging Survey to Measure Peculiar Velocities: Cosmological Implications, AAS 213th Meeting, Long Beach, CA, January 2009.
Boggs, S., "The Advanced Compton Telescope." Bull. Am. Astr. Soc. **40**(1), 37.02 (2008).
Brown, F.B., MCNP and the ENDF/B-VII Cross Section Library, MCNP Workshop, Monterey, CA, April 15, 2007.
Burin, M.J., Initial Hydrodynamical Results from the Princeton MRI Experiment, CSMO General Meeting, October 2005.
Cayton, T. E., "Geosynchronous Orbit: Life near the boundary of stable trapping," Presented at the American Geophysical Union Meeting, San Francisco, CA, December 2007.
Couture, A., Neutron Capture for Astrophysics at DANCE, Nuclear Physics, Astrophysics, and Cosmology, May 2, 2007.
Couture, A., DANCE ing Into the Future: Developing Sampling, Techniques and Facilities for Neutron Capture Measurements at LANSE, NRAM2007: Neutron Reactions on Americium, Santa Fe, NM, September 17, 2007.
Couture, A., Neutron Capture Cross Section on Lu Isotopes at DANCE, Nuclei in the Cosmos X, Mackinac Island, MI, July 27, 2008.
Couture, A., Neutron Capture Measurements for S-Process Nucleosynthesis, NSAC Long Range Plan Town Meeting, Nuclear Astrophysics and Study of Nu, Chicago, IL, January 19, 2007.
Couture, A., Neutron Capture Measurements on Plutonium Isotopes for GNEP, 8th International Topical Meeting on Nuclear Applications and Utilization of Accelerators, Pocatello, ID, July 29, 2007.
Couture, A., Neutron Capture Strategy and Technique Developments at GNEP, GNEP Reactor Working Group Meeting, Argonne, IL, August 21, 2008.
Couture, A., Reifarth, R., Feasibility of Direct (n,gamma) Experiments on S-Process Branch Points, 2007 Annual Meeting of Nuclear Physics of American Physical Society, Newport News, VA, October 10, 2007.
Cowell, S.T., ST Electroweak Interactions in Correlated Basis Theory, ECT workshop on Advanced Many-Body Methods for Nuclear Structure, Torento, Italy, July 2007.
Cox, A.N., "Pulsation and Convection in Luminous Blue Variable Stars," Evolution and Pulsation of Massive Stars, Liege, Belgium, July 7-10, 2008, CoAst 158, 259 (2009).
Detar, C., Toward a Precise Determination of Tc with 2+1 Flavor of Quarks, XXV International Symposium on Lattice Field Theory, Regensburg, Germany, July 30-August 4, 2007.
Devlin, M., GEANIE Measurements of Nuclear Data Relevant to RadChem Diagnostics, 2007 Nuclear Explosives Design Physics Conference, June 29, 2007.
Devlin, M., 6li(N,T)A Angular Distribution Measurement of 0.2<En<10 MeV at LANSCE/WNR, Nuclear Data 2007, Nice, France, April 22, 2007.
Devlin, M., The 6Li(n, a)t Reaction in the Few MeV Region: Cross Section and Angular Distribution Measurements at LANSCE/WNR, 2007 Nuclear Explosives Design Physics Conference, June 29, 2007.
Duan, H., Stepwise Swaps in the Energy Spectra of Supernova Neutrios, Supernova Physics and DUSEL: a UCSD/UCLA workshop, Los Angeles, CA, US, September 16-17, 2009.
Feng, Y., Transport Simulation towards Understanding the Field-Dependent Ultracold Neutron Production in Solid Oxygen, American Physical Society, 2009 APS April Meeting, May 2-5, 2009.
Fotiadis, N., High-Spin States in 135Cs, DNP 08 Meeting, Oakland, CA, October 23, 2008.
Fotiadis, N., High-Spin States in 88Kr, DNP07 Meeting, Nice, France, April 22, 2007.
Fotiadis, N., Recent Nuclear Structure Studies with GEANIE, EBANS Meeting, May 1, 2007.
Fotiadis, N., Level and Life-Time Studies in Odd-Odd 202, 204TI, APR08 Meeting, January 1, 2008.
Fotiadis, N., High-Spin States in 135Xe, APR07 Meeting, Denver, CO, March 5, 2007.
Friedland, A., Neutrino Signatures of Supernova Turbulence, Implications of Neutrino Flavor Oscillations (INFO07), Santa Fe, NM, July 3, 2007.

Friedland, A., Neutrinos in Cosmology, Workshop Neutrino Physics: Looking Forward, Aspen, CO, May 31, 2007.
Friedland, A., New Physics and Stellar Cooling: Neutrinos, Axions, Extra Dimensions, CIPANP 2009: Tenth Conference on the Intersections of Particle and Nuclear Physics, San Diego, CA, May 27, 2009.
Friedland, A., Observing the Explosion in Supernova Neutrinos, Implications of Neutrino Flavor Oscillations (INFO09), Santa Fe, NM, July 10, 2009.
Gehman, V., "A Novel Point Contact HPGe Detector for Searching for Neutrinoless Double-beta Decay." American Physical Society Division of Nuclear Physics Meeting, Oakland, CA, October 2008.
Gehman, V., "First Production Detectors for the MAJORANA Experiment," Third Joint Meeting of the Nuclear Physics Divisions of the APS and JPS, Waikoloa, HI, October 2009.
Gehman, V., "Loaded Liquid Scintillators for the Molybdenum Observatory Of Neutrinos (MOON)," 238th American Chemical Society National Meeting, Washington, D.C., August 2009.
Gehman, V., "Mutiple Isotope Comparison for Determining Neutrinoless Double Beta Decay Mechanisms," American Physical Society Meeting, Jacksonville, FL, April 2007.
Gehman, V., "Systematic Effects on Pulse Shape Analysis in HPGe Dectors of Neutrinoless Double-beta Decay." American Physical Society Meeting, St. Louis, MO, April 2008.
Gehman, V., "Temperature-Controlled Cooling Tests of Photomultiplier Tubes for the MiniCLEAN Dark Matter Search." American Physical Society Meeting, Denver, CO, May, 2009.
Gibson, B.F., Anomalous Magnetic Moment Effects in NN Bremstrahlung, 2007 International Nuclear Physics Conference, Tokyo, Japan, June 2007.
Gibson, B.F., Physical Observables and Model Properties of Few-body Systems, JUSTIPEN RIKEN Workshop on Exotic Nuclei, Wako, Japan, November, 2007.
Ginocchio, J., The Relativistic Harmonic Oscillator with Vector and Scalar Potentials, HAW09, Waikoloa, HI, October 13-17, 2009.
Goldman, T., All Fundamental Fermion Masses Are Vile, Neutrino 2008, Christchurch, New Zealand, May 25-31, 2008.
Goodman, J., Helical MagnetoRotational Instability and Issues in Astrophysical Jets, CSMO General Meeting, October 2005.
Guiseppe, V., "The Production of Ge-68 in Ge Detectors Due to Fast Neutrons," American Physical Society Meeting, Denver, CO, May 2009.
Guiseppe, V., "The MAJORANA Neutrinoless Double-beta Decay Experiment," American Physical Society Meeting, St. Louis, MO, April 2008.
Gupta, R., The QCD EoS from Simulations on BlueGene L Supercomputers at LLNL and NYBlue, XXVI International Symposium on Lattice Field Theory, Williamsburg, PA, July 14-19, 2008.
Guzik, J.A., "3D Solar Model Using the Djehuty Code," Poster for 25th Annual NM Astronomy Symposium, Socorro, New Mexico, January 15, 2010.
Guzik, J.A., "Early Solar Mass Loss and the Solar Abundance Problem," Poster for 25th Annual NM Astronomy Symposium, Socorro, NM, January 15, 2010.
Guzik, J.A. and the Kepler Asteroseismic Science Consortium WG4 and WG10, "Studying Hybrid gamma Doradus/delta Scuti Variable Stars with Kepler," 25th Annual NM Astronomy Symposium, Socorro, NM, January 15, 2010 (LA-UR-10-00139).
Guzik, J.A., "Early solar mass loss, opacity uncertainties, and the solar abundance problem," Stellar Pulsation: Challenges for Theory and Observation, Santa Fe, NM, May 31-June 5, 2009, eds. J.A. Guzik and P.A. Bradley, API Conf. Proc. Vol. 1170, pp. 577-581.
Guzik, J.A., "Exploring Changes in Solar Model Physics to Mitigate the Solar Abundance Problem," proceedings of GONG 2008/SOHOXXI, Boulder, CO, August 11-15, 2008.
Guzik, J.A., "Problems for the Standard Solar Model Arising from the New Solar Mixture," 21st Century Challenges for Stellar Evolution, Cefalu, Sicily, Italy, August 29-September 2, 2007, Proceedings in Mem. SA.It., Vol. 79, ed. S. Cassisi and M. Salaris, p. 481.
Guzik, J.A., "Recent Advances in Modeling Stellar Interiors," HEDLA Conference Pasadena, CA, March 15-18, 2010 (LA-UR-10-00-0261).
Guzik, J.A., "Summary: Interpretations of Asteroseismic Data," HELAS Workshop, Wroclaw, Poland, June 21-27, 2008, Proceedings LA-UR-08-06129, CoAst, 157, 279-284 (2008).

Guzik, J.A., "3D Solar Model Using the Djehuty Code," 2nd Halifax Meeting on Computational Astrophysics, October 16-18, 2009, LA-UR-09-05585 (abstract), LA-UR-09-06589 (talk) HEDLA Workshop in Rockville, MD 2009.
Guzik, J.A., "Helioseismic Tests of Alternative Solar Models with New Abundances," Cycles of Discovery, Vancouver, Canada, July 24-28, 2007.
Guzik, J.A., "1D nonlinear hydrodynamic models of Mira variables: modeling the interior/atmosphere boundary", 2nd Halifax Meeting on Computational Astrophysics, October 16-18, 2009, LA-UR-09-05584 (abstract). LA-UR-09-06588 (poster).
Haight, R., Statistical Neutron-Induced Reactions Studied by Neutron, Proton, and Alpha-Particle Emission, Workshop on Statistical Nuclear Physics and Applications, Athens, OH, July 2008.
Haight, R., Measurement of the Average Energy and Multiplicity of Prompt-Fission Neutrons and Gamma-Rays from 235, 238U(n,f) and 239Pu(n,f) for Incident Neutron Energies of 1 to 200 MeV, International Conference on Fission and Properties of Neutron-Rich Nuclides, Sanibel Island, FL, November 11, 2008.
Haight, R., Future Possible LSDS Measurements for Fission on 240Am and 237U, Nuclear Reactions on Americium Workshop, Santa Fe, NM, September 17, 2007.
Haight, R., Measurement of the Spectrum of Neutrons Emitted in Neutron-Induced Fission, American Phsyical Society, Division of Nuclear Physics, Oakland, CA, October 23, 2008.
Haight, R., Measurement of the Average Energy and Multiplicity of Prompt, NEDPC 2007: Nuclear Explosives and Design Conference, July 10, 2007.
Haight, R., Nuclear Data Experiments at LANSCE: Highlights 2007, Cross Section Evaluation Working Group, Brookhaven, NY, November 4, 2008.
Haight, R., Nuclear Data Experiments at LANSCE: Highlights 2008, Cross Section Evaluation Working Group and US Nuclear Data Program, OakRidge, TN, October 29, 2008.
Haight, R., Nuclear Data Research at LANSCE with Possible Relevance to IFMIF, IAEA Technical Meeting on Nuclear Data for Advanced Systems-Fusion, Vienna, Austria, October 31, 2007.
Haight, R., Wender, S., Radionuclide Production Cross Sections from 800-MeV Proton Interactions in Ge and Mo Targets, American Phsyical Society, Division of Nuclear Physics, Oakland, CA, October 23, 2008.
Hickerson, K., A Gravito-Magnetic Trap for Measuring the Neutron Lifetime using Ultracold Neutrons, 3rd Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan, October 13–17, 2009, Abstract: CK.00005.
Hime, A. "A DEAP & CLEAN Program for WIMP Dark Matter." American Physical Society Meeting, Jacksonville, FL, April 2007.
Holley, A. T.. Precision UCN Polarimetry and the UCNA Experiment. 3rd Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan, October 13–17, Abstract: KK.00008.
Holloway, S.T., The Next Generation, Accelerator Radiation Induced Activation, ST CINDER 2008, Cadarache, France, September 29-October 2, 2009.
Holloway, S.T., The Next Generation, Accelerator Radiation Induced Activation, Compound Nuclear Reaction 2009, Bordeaux, France, October 2009.
Holloway, S.T., The Next Generation, Accelerator Radiation Induced Activation, ST CINDER 2008, Villigen, Switzerland, October 13-17, 2008.
Holz, D.E., Cosmology from standard sirens, SnowPAC 2009, Snowbird, UT, February, 5, 2009.
Holz, D.E., Gravitational-wave Constraints on Dark Energy, Understanding the Dark Sector: Dark Matter and Dark Energy, Aspen Winter Workshop, Aspen, CO, January 30, 2009.
Holz, D.E., On LISA and SNAP, NRC Town Hall meeting, Newport Beach, CA, February 1, 2007.
Hoover, A.S., "Measurement of plutonium in spent nuclear fuel by self-induced X-ray fluorescence," 50th Annual INMM Meeting, Tucson, AZ, July 2009.
Hoover, A.S., "Microcalorimeter arrays for ultra-high energy resolution X- and gamma-ray detection," Methods and Applications of Radioanalytical Chemistry VIII conference, Kona, HI, April 2009.
Hueckstaedt, R.M., Multi-Dimensional Simulations Of Helium Shell Flash Convection, 209th Meeting of the American Astronomical Society, Seattle, WA, January 7-11, 2007.
Hueckstaedt, R.M., Local And Global Radiative Feedback: The Rise of Early Stellar Populations, 213th Meeting of the American Astronomical Society, Long Beach, CA, January 4-8, 2009.
Hungerford, A., Institute for Nuclear Theory Workshop on Neutron Star Crusts July 2007, Seattle, WA "Neutrino Transport with Detailed Scattering Cross-Section Standards: Measurements and Evaluation Techniques", October 13-15, 2008.

Jandel, M. (2008). Neutron capture and neutron-induced fission experiments on americium isotopes with DANCE. The 13th Int. Symp. On Capture Gamma-Ray Spectroscopy and Related Topics; August 25, 2008; Cologne, Germany.
Jianglai L., Overview of the UCNA Experiment, 3rd Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan, October 13–17, 2009, Abstract: CK.00006.
Kahler, A.C., Reaction Rate Testing in LANL Fast Critical Assemblies, LANL-LLNL Fission Workshop, Los Alamos, NM, February 2009.
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Program Development Initiatives and Programs

Staff in the NPAC capability area are actively engaged in program development initiatives and programs with other federal agencies, national laboratories, universities, and industry. The following list shows descriptions of some programs and initiatives. The list was compiled via selective submissions by staff in this capability area.

Federal Agencies

Collaboration with NIST Laboratory on development and fabrication of microcalorimeter detector arrays.

DOE/HEP funded work with Fermilab to on the LBNE Near Detector. Rajan Gupta facilitated the development of a Memorandum of Understanding and collaboration with Fermilab on the LBNE. Chris Mauger was selected as project manager for the near detector complex.

Habib S., PI on two funded proposals with DOE HEP under the Dark Energy R&D program (Project Title: Going Nonlinear with Dark Energy, FY08 and FY09). The project carried out large-scale simulations for precision determination of the distribution of matter in the universe, essential predictions for weak lensing mass mapping surveys.

Haines, T., Hayes, A.C., DOE NA-22 funding for feasibility studies for monitoring the content of reactor fuel using interactions with the reactor containment wall. This project is investigation whether reactions with anti-neutrino emitted from a reactor with the containment wall could be used as a signal for the number of anti-neutrinos being emitted.

Hayes, A.C., DOE NNSA C-10 Funding for Detailed Assessment of the Diagnostic Suite at NIF. This project is aimed at a unified assessment of the all of the diagnostics presently planned for NIF. By the end of FY2011, more than 20 diagnostic probes are planned for NIF, measuring a range of physics ranging from the neutron and gamma-ray spectrometers to x-ray and neutron imaging. We are focusing on maximizing the information from these and determining if new diagnostics should be added.

Hayes, A.C., DOE NNSA PEM funding for Disentangling the Physics of Mix from Charged -Particle Stopping in a NIF Capsule. This project is aimed at using the differences in excitation functions for different charged-particle reaction taking place in a NIF capsule to extract the charged-particle stopping power. With knowledge of the stopping, these diagnostics can be coupled with a measurement of the reaction-in-flight neutrons to extract the degree and nature of the mix taking place.

Hayes, A.C., Wu, C.Y. (Livermore). DOE Stimulus Funding for Improved Prompt and Decay Spectra for Advanced Reactor Fuels. The project is to characterize the radiation emitted during the burning of advanced reactor fuels, including fast neutron configurations, MOX plutonium, and reusable spent fuels. This radiation includes prompt gammas and neutrons, and delayed neutrons and gamma, betas, antineutrinos, and charged particles. It is a joint project between Los Alamos and Lawrence Livermore.

Hi, L., National Science Foundation Physics Frontier Center for Magnetic Self-Organization. We are receiving funding from DOE/OFES on our work in Plasma Astrophysics.

Grasser, M.L., DOE Office of Science HEP through American Recovery and Reinvestment Act, Washington, DC, 2009.

Grasser, M.L., DOE Office of Science HEP through DOE External Grant Review, Washington, DC, July 2008.

Plesko, K., Participated in DTRA-sponsored workshop on asteroid hazard mitigation, October 19-22, 2009, informal informational workshop, Memoradum of Understanding pending release of funding.

Talou, P., ARRA Stimulus Project on Neutron Cross Section Covariances for ENDF/B-VI. Principal investigator at LANL for this BNL-LANL funded project, which aims at evaluating a large number of

uncertainties associated with the evaluated nuclear data files present in the US ENDF/B-VII library. The applications of this project are numerous, but will in particular benefit the development of innovative reactors.

Warren, M.S., Software Tools to Enable Reliable High-Performance Distributed Disk Arrays, NASA Applied Information Science Research Program, 2008.

Warren, M.S., Taking Measure of the Universe with Galaxy and Cluster Surveys, National Science Foundation, 2008 - 2011.

Academia

Guzik, J.A., MRI proposal, "MRI-R2 Consortium: Acquisition of the U.S. Contribution to SONG: A Global Telescope Network for Asteroseismology and Exoplanets," with New Mexico State University and Aarhus University, Denmark.

Habib S., led LANL involvement in next-generation cosmological surveys. LANL is now an institutional member of the Large Synoptic Survey Telescope (LSST) project. An LSST-related Memorandum of Understanding has been signed with UC Davis.

Talou, P., Advanced Fuel Cycle Initiative-Nuclear Energy University Program (AFCI-NEUP). Led a successful proposal by a consortium of three universities (University of New Mexico, Rensselauer Polytechnic Institute, University of Tennessee Knoxville) and LANL to improve theories and modeling entering in the evaluation of nuclear data and uncertainties used in the development of the next generation of nuclear reactors. This is a three year project, started in October 2009.

Warren, M.S., Deep Investigation of Neutral Gas Origins ASKAP Science TeamInternational Center for Radio Astronomy Research, University of Western Australia, DINGO.

Warren, M.S. Commensally Real-time ASKAP Fast Transients (CRAFT) Survey Science Team, International Center for Radio Astronomy Research, University of Western Australia, CRAFT.

Multiple Agencies

Collaboration of government institutions and universities for the development, installation, and use of the NCAM single photon imaging camera.

Collaboration with a 40+ consortium of international universities and research institutions on the development of a next-generation space observatory for Exploration of Diffuse emission and Gamma-ray burst Explosions (EDGE).

Collaboration with UC Berkeley, University of New Hampshire, Naval Research Laboratory, UC Riverside, NASA/Goddard Space Flight Center, and several other University researchers on development of the next generation telescope for MeV gamma-ray astronomy and nuclear astrophysics.

The Fermi Gamma-ray Burst Monitor is a 10+ year program to design, build, and operate a gamma-ray burst instrument for the NASA Fermi Satellite Mission. For this program LANL partners with NASA/MSFC and the University of Alabama in Huntsville. LANL developed all simulation capability for the program and simulation results that are used for all scientific data analysis.

Cooper, Martin Contractor Project Manager for the nEDM Project until May 2009.

Guzik, J.A., IRSES (international staff exchange proposal) for working on asteroseismology and stellar interiors with European collaborators in France, England, Belgium, Denmark, Poland, Spain, and Portugal.

Hayes, A.C., DOE NA-22 Funding for Temporal Variations in the Antineutrino Spectra Emitted from CANDU Reactors. This project is to characterize the spectrum of emitted antineutrinos expected from the refurbished

CANDU-6 reactor in Point Lepreau, New Brunswick, Canada. This reactor has the unique feature that it will start with fresh reactor fuel when re-commissioned. This project is a collaboration between AECL in Canada, Los Alamos, Lawrence Livermore and Sandia National Labs.

Industry

CRADA with InnoSense Corporation on techniques for the application of coatings to light guides. The coatings of interest are wavelength shifters dissolved in a polystyrene matrix.

Stand Off Radiation Detection System (SORDS) is a three-year DHS/DNDO program where LANL partnered with Raytheon Corporation to successfully design, build, and field test a large, truck-mounted gamma-ray detection system. The system design and analysis software was derived directly from LANL capabilities in gamma-ray astronomy.

Regular Colloquia, Seminars, or Discussion Series Organized by LANL

The following list shows the variety of colloquia, seminars, and discussion series organized at LANL by the NPAC capability area staff. The list was compiled via submissions by staff in this capability.

HEP Seminar Series, Los Alamos, POC: Grasser, M.L

- Shelton, J., Rutgers University, February 9, 2009
- Ruderman, J., LAS/Princeton, April 17, 2009
- Johnson, M., Caltech, October 9, 2009
- Morrissey, D., TRIUMF, March 16, 1009
- Falkowski, A., Rutgers University, October 2, 2009
- Galloway, J., UC Davis, October 16, 2009
- O'Connell, D., Princeton, October 19, 2009
- Greshman, M., Caltech, October 23, 2009
- Seng Goh, H., UC Berkeley, November 6, 2009

2009 LANL Space Science and Applications Seminar Series (ISR-1)

- Kevin Henderson, P-21, "Time-averaged arbitrary optical dipole potentials for dynamic manipulation of Bose-Einstein condensates," Jan. 21
- Jeremie Lasue, Ecole Polytechnique, France, "Solid Component Of Comets: From Dust To Cometary Nuclei," Jan. 27
- Jeffrey Klenzing, University of Texas at Dallas, "Effects of non-ideal biased grids on ion velocity and temperature estimates obtained from RPA data," Feb. 23
- John J. Podesta, University of New Hampshire, "Three-dimensional wave vector spectrum of solar wind turbulence: The holy grail," Mar 3
- Brian Larsen, Boston University, "FIREBIRD: A Two-Cubesat Science Mission for Focused Radiation Belt Studies," Apr. 14
- Bob Reedy, ISR-1 & Paul Scherrer Inst., "Energetic Particles from Our Unpredictable Sun," Apr. 21
- Russ Terry, Yale University, "Mapping the Breakdown of the N=20 Neutron Magic Number in Neutron-Rich Nuclei," Apr. 21
- J. Gilbert, Univ of Michigan, "n Optimized 3D Linear-Electric-Field Time-of-Flight Analyzer," Apr. 27
- Gregg McKinney, D-5, "Recent MCNPX Features of Interest to Space Sciences," Apr. 28
- Brian Fraser, University of Newcastle, "ULF Waves in the Earth's Magnetosphere," May 5
- Tim Cassidy, University of Virginia, "Space radiation and thin atmospheres: Europa and Enceladus," May 15
- Andreas Zoglauer, UC Berkeley, "New Methods of Event and Image Reconstruction for the Nuclear Compton Telescope," Jun. 2
- Mick Denton, University of Lancaster, "High speed solar wind streams : Repeatable drivers for system science in the magnetosphere," Jul. 21
- William Sailor, ISR-4, "Space Based SciFi Neutron Detector," Aug. 4
- Drew Turner, University of Colorado, "Earth's outer radiation belt: Recent work on improving forecasts, understanding sources, and a new particle detector design," Aug. 11
- Anthony Chan, Rice University, "Modeling Wave-Particle Interactions of Relativistic Electrons in Earth's Radiation Belts," Aug. 12
- Tom Cayton, ISR-1, "Energetic Particle Measurements: From Data to Information," Aug. 25
- Alexi Klimenko, Passport Systems Inc., "Nuclear Resonance Fluorescence and Effective-Z Determination in Non-Intrusive Cargo Screening," Aug. 31
- Kevin Henderson, P-21, "Approaching Neptune: A Team-X Endeavor," Dec. 1

P-25 Weekly Seminar Series

Director's Colloquium Series, Gupta, R.

T-2 Colloquia

- Reddy S., Grasser, M.L., LHC: From Here to Where?, December 7, 2009
- Holz, D.E., Cosmology from Gravitational Waves, October 19, 2009

Conferences and Workshops Organized by LANL

Staff in the NPAC capability area host and/or organize a broad variety of conferences and workshops designed to foster active participation by a wide range of collaborators and potential collaborators in academia, other research laboratories, and industry. This list was compiled via submissions by staff in this capability area.

Nucleon Spin Structure and Gauge Invariance: An Atomic View, Multiple Locations

Peregrinations in Neutrino Masses and Mixings, Info'07, Implications of Neutrino Flavor, Santa Fe, NM, July 6, 2007

Implications of Neutrino Flavor Oscillations (INFO 07), Santa Fe, NM, July 2007

Santa Fe Cosmology Summer Workshops, Santa Fe, July 2-20, 2007

Unparticle Physics, October 1, 2007

Gamma Ray Bursts 2007 Conference, Santa Fe, November 5-9, 2007

Los Alamos National Laboratory Space Forum, Los Alamos, NM, January 29-30, 2008

Department of Physics and Astronomy, UNM, Nuclear Physics: The Study of Quark Chemistry?, March 2008

All Fermions Are Vile, University of Canterbury, Christchurch, New Zealand, June 6, 2008

International Conference First Asian-Pacific Symposium on Astrophysical, Space and Laboratory Plasmas, Beijing, China, June 18-21, 2008

Santa Fe Cosmology Summer Workshops, Santa Fe, June 30-July 18, 2008

New Physics at the Large Hadron Collider, LANL Summer School for Undergraduates, Los Alamos, NM, July 31, 2008

Third East-Asia Numerical Astrophysics Meeting, NanJing, China, November 10-13, 2008

SpinFest 2009, BNL

FNAL E906 Collaboration and Software Meeting, Los Alamos, January 2009

LANL/LLNL Workshop on Nuclear Fission, Los Alamos, NM, February 3-6, 2009

US CMS Heavy Ion Workshop, Santa Fe, April 2009

Spin Physics sessions at the XVIII International Workshop on Deep-Inelastic Scattering and Related Subjects (DIS 2010), Florence, Italy, April 19-23, 2010, http://dis2010.to.infn.it/

Superfluid Heat Conduction in Magnetars, Santa Fe, NM, May 18-21, 2009

Stellar Pulsation, Challenges for Theory and Observation, Santa Fe, NM, May 31-June 5, 2009

Workshop on Transverse Spin, RHIC & AGS Users' Meeting, BNL, June 1, 2009

12th International Conference on Nuclear Reaction Mechanisms, Verenna, Italy, June 15-19, 2009

Implications of Neutrino Flavor Oscillations (INFO 09), Santa Fe, NM, July 6-10, 2009

Santa Fe Cosmology Summer Workshops, Santa Fe, July 6-24, 2009

Research Opportunities with Ultracold Neutrons in the US, Santa Fe, NM, November 6-8, 2009

RHIC & AGS Annual Users' Meeting, June 7-11, 2010

Symposium on Educational Outreach, BNL, June 9, 2010

Workshop on Transverse Momentum Dependent Distributions (TMD 2010), ECT*, Trento, Italy, June 21-25, 2010

American Physical Society's Division of Nuclear Physics 2010 Fall Meeting, Santa Fe, NM, November 2010

Educational Programs Organized by LANL

Staff in the NPAC capability area organize educational activities that include summer schools and other programs aimed at students, internal and external to the Laboratory, on specific, focused topics.

Earthwatch Expedition "Transient Phenomena in Astrophysics", June 17-30, 2007, (Timmes) see http://laastro.lanl.gov/earthwatch/07/

Earthwatch Expedition "Transient Phenomena in Astrophysics", July 6-19, 2008, (Hungerford) see http://laastro.lanl.gov/earthwatch/08/

Earthwatch Program, Astrophysics high school experience. This is a 2-week program for students from smaller high schools to come to LANL and work on astrophysics projects and learn about astrophysics. Organizers included scientists from X, ISR, and CCS divisions.

LASSO (now LAESSA) Teacher's Workshop is a series of 2-week summer programs for LANL scientist to teach Middle-High school teachers about their work (Palmer 2007, 2008, and 2009)

Hubert van Hecke has served as "Mr. Science" to various classes in the Santa Fe public school systems since 1996.

The Los Alamos Summer School in Physics is a joint venture between Los Alamos National Laboratory (LANL) and the University of New Mexico (UNM). The program runs for 10 weeks in the summer and features a combination of classes in many areas of physics as well as individual research projects with staff members at LANL and faculty at UNM, http://www.phys.unm.edu/LASS.

Mottola, E., Quantum Field Theory II, remote graduate course offered jointly with LANL Institutes for Advanced Studies and Florida Atlantic University (Physics 6669) Graduate, 12 lectures of 90 minutes each plus problem sets and final exam. Six graduate students in class and additional LANL staff, IAS LANL.

Professorships, Committees, and Advisory Board Memberships

Staff in the NPAC capability area are active in the external research community by serving on committees and advisory boards and as adjunct professorships with academic institutions. The list was compiled via submissions by LANL staff in this capability area.

Aidala, C., elected member, RHIC & AGS Users' Executive Committee, June 2009-present
Bhattacharya, T., Santa Fe Institute, Professor
Brooks, M. L., Detector Council Member for Forward Silicon Vertex Detector (FVTX) for PHENIX
Cooper, M., Co-spokesperson of the nEDM Experiment
Cooper, M., DNP Program Committee
Cooper, M., LANL LDRD DR Scientific Team for NPAC
Cooper, M., Member and Chair, LANL Fellows Selection Committee
Cooper, M., NSERC proposal reviewer
Cooper, M., NSF proposal reviewer
Elliott, S.R., Deep Underground Science and Engineering Laboratory Experiment Development and Coordination Committee
Elliott, S.R., University of New Mexico, Adjunct Professor
Elliott, S.R., University of Washington, Adjunct Professor
Fryer, C., University of Arizona, Adjunct Professor
Fryer, C., University of New Mexico, Adjunct Professor
Gibson B.F., American Physical Society: Division of Nuclear Physics, Secretary-Treasurer
Gibson B.F., Physical Review C, Senior Editor
Gibson, B.F., 10th International Conference on Hypernuclear and Strange Particle Physics, International Advisory Committee
Gibson, B.F., 19th International Conference on Few-Body Problems in Physics, International Advisory Committee
Gibson, B.F., 4th Asia-Pacific Conference on Few-Body Problems in Physics, International Advisory Committee
Gibson, B.F., American Physical Society: Division of Nuclear Physics, Executive Committee
Gibson, B.F., American Physical Society: Division of Nuclear Physics, Program Committee
Gibson, B.F., American Physical Society: Few-Body Systems Topical Group, Nominating Committee
Gibson, B.F., Few-Body Systems, Editorial Board
Gibson, B.F., International Symposium on Strangeness in Nuclear and Hadronic Physics, International Advisory Committee
Goldman, T.J., New Mexico State University, Adjunct Professor
Goldman, T.J., University of New Mexico, Adjunct Professor
Graesser, M.L., Laboratory Directed Research and Development (LDRD) Scientific Review Committee, 2008 ER and 2009 ER, Member
Gupta, R., University of New Mexico, Adjunct Professor
Guzik, J.A., Kepler Asteroseismic Consortium Working Group #10 on Gamma Doradus Variable Stars, Chair (2009-present)
Hale G.M., National Science Foundation, Proposals Reviewer
Heitmann, K., National Science Foundation Panel on Extragalactic Astronomy, 2008 and 2009
Jiang, X., Jefferson Lab experiment E05-015 ("Quasi-elastic A_y"), co-spokesperson
Jiang, X., Jefferson Lab experiment E06-010 ("Neutron Transversity"), co-spokesperson and contact
Jiang, X., Jefferson Lab experiment E06-014 ("Neutron d_{2n}"), co-spokesperson
Jiang, X., Jefferson Lab experiment E07-011 ("Deuteron g_{1d}"), co-spokesperson
Jiang, X., Jefferson Lab experiment E07-013 ("DIS-SSA"), co-spokesperson
Jiang, X., Jefferson Lab experiment E10-006 ("SoLID-Transversity"), co-spokesperson
Kahler, A.C., 2009 International Conference on Advances in Mathematics, Computational Methods, and Reactor Physics, Member
Kahler, A.C., Cross Section Evaluation Working Group Data Validation Committee, Chairman
Kahler, A.C., Cross Section Evaluation Working Group Executive Committee, Member

Kahler, A.C., International Conference on Nuclear Data for Science & Technology 2010, Member
Kahler, A.C., International Criticality Safety Benchmark Evaluation Project, Member
Kahler, A.C., Nuclear Data Advisory Committee, Member
Kapustinsky, J., DOE-NP Fundamantal Neutron Physics Beamline Review Committee, Member
Klein, A., Old Dominion University, Adjunct Professor
Leitch, M.J., APS GHP Fellowship Committee (2008)
Leitch, M.J., PHENIX Deputy Director for Upgrades (2009)
Leitch, M.J., PHENIX Executive Council, Member; Convener for Heavy-Quark Physics; and Detector Council Representative for the Muon Tracking Subsystem
Leitch, M.J., PHENIX Run Coordinator for the 2007 and 2008 RHIC runs
Leitch, M.J., PHENIX Speakers Bureau (2009)
Leitch, M.J., STAR Heavy Flavor Tracker (HFT) DOE CD-1 Review Committee (2009)
Li, H., APS/Division of Plasma Physics Meeting, Program Committee
Li, H., Rice University, Adjunct Associate Professor
Liu, W., 2009 Annual Meeting of CMSO, Workshop Organizer
Louis, W.C., DOE/NP OJI Review, Committee Member
Louis, W.C., Lehman Review of JLAB 12 GeV Upgrade, Committee Member
Louis, W.C., Lehman Review of NOvA Experiment, Committee Member
Louis, W.C., National Science Foundation PNA Review, Committee Member
Louis, W.C., NSERC Technical Review for SNO+, Committee Member
Mottola, E., CERN, Scientific Associate
Mottola, E., Florida Atlantic University, Associate Professor of Physics
Rielage, K., University of New Mexico, Adjunct Assistant Professor
Sierk, A.J., Nuclear Science Program Advisory Committee, LANSCE 2007-2009, Member
Sinnis, G., Joint Department of Energy National Science Foundation Panel Review of VERITAS (December 2010)
Sinnis, G., Michigan State University, Adjunct Professor
Takeyaso, I., LANL LDRD ER committee for NPAC
Talou, P., International Conference CNR*09 on Compound Nuclear Reactions and Related Topics, Program Committee
Talou, P., International Conference on Nuclear Data for Science & Technology, Member
Warren, M.S., LANL Open Super Computer Source, Selection Committee
Warren, M.S., NASA Applied Information Science Review, Review Panel
Warren, M.S., National Science Foundation Galaxy Theory Review Panel, Chair

Conference Proceedings and Journal Referees

Staff in the NPAC capability area serve the larger scientific community by serving as referees on technical journals. The list was compiled via submissions by LANL staff in this capability area.

Alam, U., Physical Review D
Cooper, M., NIM
Cooper, M., Physical Review Letters
Cooper, M., Physics Letters
Duan, H., Physical Review D
Forbes, M.M., Annals of Physics
Forbes, M.M., Physical Review
Forbes, M.M., Physical Review Letters
Friedland, A., International Journal of Modern Physics E
Friedland, A., Journal of Cosmology and Astroparticle Physics
Friedland, A., Journal of High Energy Physics
Friedland, A., Physical Review D
Friedland, A., Physical Review Letters
Fryer, C., Astronomy & Astrophysics
Fryer, C., Astrophysical Journal
Fryer, C., Monthly Notices of the Royal Astronomy Society
Fryer, C., Physical Review D
Fryer, C., Physical Review Letters
Galassi, M., Palmer, D., and Fenimore, E. (editors) Gamma Ray Bursts 2007, Proceedings of the Santa Fe Conference, Santa Fe, New Mexico, (AIP 2007)
Gibson, B.F., Bulletin of the American Physical Society
Gibson, B.F., Few-Body Systems
Gibson, B.F., Journal of Physics G
Gibson, B.F., Nuclear Physics A
Gibson, B.F., Physical Review
Gibson, B.F., Proceedings of the 10th International Conference on Hypernuclear and Strange Particle Physics, Nuclear Physics A
Gibson, B.F., Proceedings of the International Symposium on New Facet of Three Nucleon Force, 50 years of Fujita- Miyazawa Three Nucleon Force
Goldman, T.J., Advances in High Energy Physics
Goldman, T.J., Euro Physics Letters
Goldman, T.J., International Journal of Modern Physics A
Goldman, T.J., International Journal of Modern Physics E
Goldman, T.J., Modern Physics Letters A
Goldman, T.J., Physical Review C
Goldman, T.J., Physical Review D
Goldman, T.J., Physical Review Letters
Goldman, T.J., Physics Letters B
Graesser, M.L., Journal of Cosmology and Astrophysics
Graesser, M.L., Journal of High Energy Physics
Graesser, M.L., National Science Foundation
Graesser, M.L., Physical Review D
Graesser, M.L., Physical Review Letters
Graesser, M.L., Physics Letters B
Gupta, R., Physical Review D
Gupta, R., Physical Review Letters
Guzik, J.A., Astronomy and Astrophysics
Guzik, J.A., Astrophysical Journal
Guzik, J.A., Astrophysics and Space Science

Guzik, J.A., Communications in Asteroseismology
Guzik, J.A., Monthly Notices of the Royal Astronomical Society
Hale, G.M., Journal of Physics G
Hale, G.M., Nuclear Fusion
Hale, G.M., Nuclear Physics A
Hale, G.M., Nuclear Science and Engineering
Hale, G.M., Physical Review C
Hale, G.M., Physical Review D
Hale, G.M., Physical Review Letters
Hale, G.M., Reports on Progress in Physics
Heitmann, K., Astrophysical Journal
Heitmann, K., Physical Review D
Heitmann, K., Physical Review Letters
Holz, D.E., Astrophysical Journal
Holz, D.E., Astrophysical Journal Letters
Holz, D.E., Monthly Notices of the Royal Astronomical Society
Holz, D.E., Physical Review D
Holz, D.E., Physical Review Letters
Hoover, A.S., IEEE Transactions on Nuclear Science
Hoover, A.S., Nuclear Instruments and Methods in Physics Research A
Jiang, X., Physical Review D
Kapstinsky, J., IEEE Transactions on Nuclear Science
Kapstinsky, J., Physical Review Letters
Kippen, R. M., Astrophysical Journal
Kippen, R. M., Geophysical Research Letters
Kippen, R. M., IEEE Transactions on Nuclear Science
Kippen, R. M., Nuclear Instruments and Methods in Physics Research A
Leitch, M. J., Helmholtz foundation grants
Leitch, M. J., International Journal of Modern Physics A
Leitch, M. J., Journal of Physics G
Leitch, M. J., Physical Review Letters C
Leitch, M. J., Physical Review Letters D
Leitch, M. J., Physics Letters B
Li, H., Astronomy and Astrophysics
Li, H., Astrophysical Journal
Li, H., Journal of Geophysical Research
Li, H., Nature
Liu, W., Astrophysical Journal Letters, Referee.
Liu, W., Physical Review E
Liu, W., Physical Review Letters
Liu, W., Physics Letters A
Liu, W., Physics of Fluids and Physics of Plasmas
Mauger, C., Physical Review C
Moller, P., European Physical Journal A
Moller, P., Journal of Modern Physics E
Moller, P., Journal of Nuclear Science and Technology
Moller, P., Journal of Physics G
Moller, P., Nuclear Physics A
Moller, P., Physical Review C
Pope, A., Astrophysical Journal
Rockefeller, G., Monthly Notices of the Royal Astronomy Society
Sharma, R., Physical Review D
Sierk, A.J., Euro Physics Journal A

Sierk, A.J., Nuclear Physics A
Sierk, A.J., Physical Review C
Sierk, A.J., Physical Review Letters
Sierk, A.J., Physics Letters F
Takeyasu, I., Physical Review Letters
Talou, P., Annals of Nuclear Energy
Talou, P., International Conference on Nuclear Data for Science & Technology
Talou, P., Nuclear Instruments and Methods Journal
Talou, P., Nuclear Science and Engineering
Warren, M.S., Astrophysical Journal
Warren, M.S., Concurrency and Computation
Warren, M.S., Monthly Notices of the Royal Astronomical Society
Warren, M.S., New Astronomy

Classified Reports

The following list shows the classified reports by NPAC capability area staff as submitted by staff.

LACP#	Date Received	Unclassified Title
LA-CP-07-0309	April 2007	The Redwing Lacrosse Opacity Experiments (U)
LA-CP-07-0793 LA-CP-07-1596	October 2007	Results for Variants of TP77 (U)
LA-CP-07-1325 LA-CP-07-0767	October 2007	LDRD20070518-DR Development of a Magnetically Driven Target for Thermonuclear Burn Studies (U)
LA-CP-08-00737	October 2008	TP77 Radiation Hydrodynamics Comparisons (U)
LA-CP-08-00738	October 2008	Feature Sensitivity Study for a Fusion Target Driven by Velocity Multiplication Using Colliding Shells (U)
LA-CP-08-00774	June 2008	TP77 Variants Compared (U)
LA-CP-08-01023	October 2008	TP40 and TP40A Studies with an ASC Code (U)
LA-CP-08-1569	2008	Final Report on the Analysis of On-orbit Data from the SABRS Validation Experiment (SAVE) (U)
LA-CP-09-14401	July 2009	Development of a New Material Specification: Part 1 (U)
LA-CP-09-14402	July 2009	Development of a New Material Specification: Part 2 (U)
LA-UR-09-06620 LA-UR-10-00274	October 2009	Status of LDRD-DR-20070518 Development of a Magnetically Driven Target for Thermonuclear Burn Studies (U)

Technology Transfer and External Awards

The following list shows selected awards, external recognition, and patents as submitted by staff.

Chadwick, M., APS Fellow

Clayton, S., "2009 Dissertation Award in Nuclear Physics" with the citation "for measurement of the rate of muon capture in hydrogen gas and determination of the proton's pseudoscalar coupling," 2009 APS April Meeting

Frankle, C., 2008 DOE/NNSA Defense Program Award of Excellence

Frankle, C.M., J.A. Becker, C.P. Cork, N.W. Madden,"Handheld Isotope Identification System," U.S. Patent 7161150 (January 9, 2007)

Fryer, C., APS Fellow

Funsten, H.O., "Linear Electric Field Time-Of-Flight Ion Mass Spectrometers," Patent #7385188 (June 2008)

Gibson, B.F., 2007 DNP Distinguished Service Award

Hale, G.M., 2007 NNSA Defense Programs Award of Excellence for Significant Contributions to the Stockpile Stewardship Program

Hime, A., APS Fellow

Makela, M., muon tomography technology transfer to Decision Sciences

Reddy, S., APS Fellow

Sailor, W., Satellite Systems Review Panel Joe D. Marshall Award for Outstanding Technical Presentation (2007)

Sinnis, G., APS Fellow

Vivtev, I., 2009 Presidential Early Career (PECASE) Awards

Warren, M.S., Supercomputing '07 Storage Challenge Award