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Title:	CEA/DAM DOE/NNSA Agreement on Cooperation in Fundamental Science Supporting Stockpile Stewardship at Los Alamos
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Abstract:

Presentation of **CEA/DAM DOE/NNSA Agreement on Cooperation in Fundamental Science Supporting Stockpile Stewardship at Los Alamos**

CEA/DAM DOE/NNSA Agreement on Cooperation in Fundamental Science Supporting Stockpile Stewardship at Los Alamos

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Agreement on Cooperation in Fundamental Science Supporting Stockpile Stewardship

Objectives

- Establish and conduct R&D in unclassified fundamental science
- Supporting stockpile stewardship
  - Condensed Matter and Materials Physics
  - Atomic and Plasma Physics
  - Nuclear Physics
- Enhance fundamental scientific contributions toward predictive capabilities
- Augment and complement existing fundamental science programs

Major Milestones

- Jan. 2000 Letter from Dr. Bouchard, DAM Director : "Opportunity to strengthen our relationship"
- Mar. 2000 Letter from Gen. Gioconda, DP Acting Assistant Secretary for Defense Programs supporting "unclassified basic science cooperation"
- March 13, 2002 Agreement signed by General John Gordon, NNSA Administrator and Alain Delpuech, DAM

RECENT MEETINGS

- December 8-10, 2006 General Meeting Paris
- May 19, 2008 Steering Committee Washington, DC
- March 31 to April 2, 2009 General Meeting Livermore, CA
- May 21, 2010 Steering Committee, Paris

Management Structure

- Steering Committee
  - Two (2) co-chairs: 1 NNSA + 1 DAM
  - Two (2) Management Points of Contact (MPOC): 1 NNSA + 1 DAM
  - Team of Technical Coordinators: 1 from each participating NNSA and DAM laboratory
- Meetings of Steering Committee
  - Approve and monitor the collaborations under the agreement
  - Location will alternate between France and U.S.
  - Steering Committee discussions regarding approval/disapproval of collaborative projects will be closed. All presentations of proposed new projects will be open to all attendees
- Evaluation of the Agreement
  - The Steering Committee minutes will represent the record for the evaluation of the success of the scientific collaboration process and will be forwarded to the leadership of the DAM and the NNSA.

Current (Feb 2010) Management

- Co-Chairs of Steering Committee
  - France Thierry Massard
  - U.S.A. DimitriKusnezov/Chris Deeney
- Management Points of Contact
  - France Christophe Thiebaut
  - U.S.A. Michael Kreisler
- Laboratory Technical Coordinators
  - LANL Paul Dotson
  - LLNL Christian Mailhiot
  - SNL Dillon McDaniel
  - B-III Christophe Thiebaut

Motivations of Joint CEA/DAM - DOE/NNSA Agreement

- Collaborate on scientific problems on common interest, leveraging our resources and investments
- Share our unique resources (e.g. LANSCE)
- Validate simulation codes and databases through peer review with multiple datasets
- Transfer new diagnostics and techniques
- 27 active projects in progress under the Agreement

Nuclear Physics: Technical Overview

Experimental Projects:

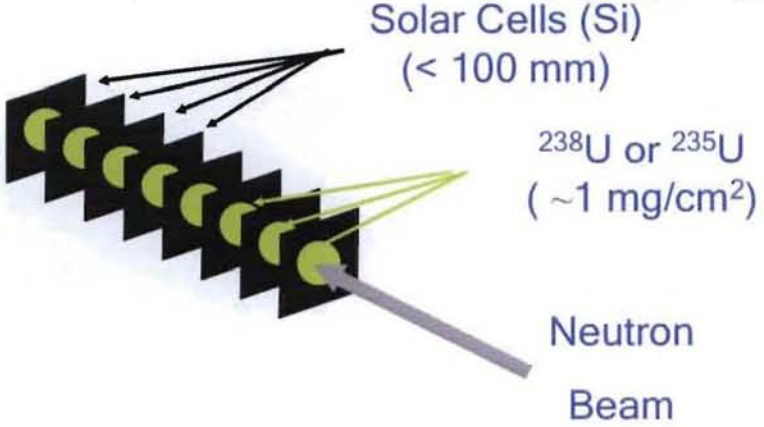
- LANSCE: fission cross sections $^{235,238}U$,^{237}Np using DAM fission chamber
  - X-section $^{235m}U(n,f)$ using DAM spectrometer
  - X-section ^{238}Pu
  - In fission resonances
- CALIBAN (CEA-Valduc): $^{235}U(n,n')\ ^{235m}U$

Theoretical projects: Modeling and Nuclear Data Evaluation

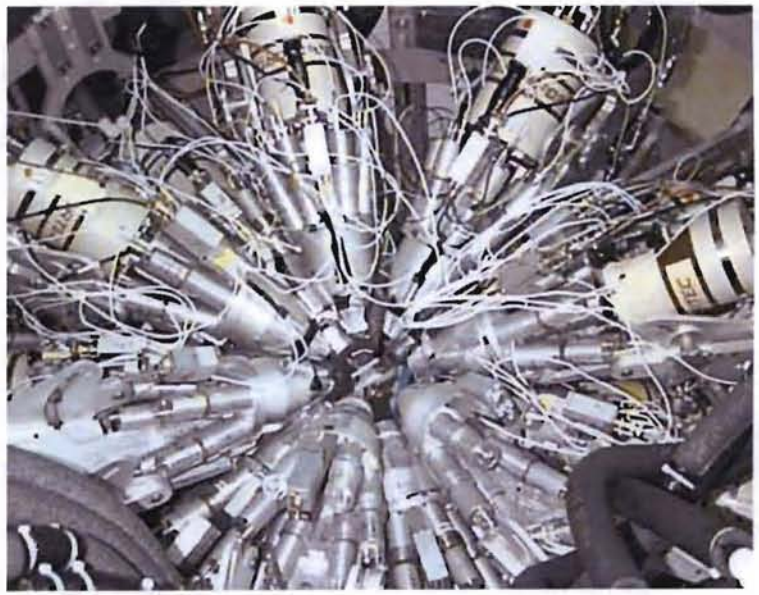
- Nuclear reaction modeling and exchange of data and validation
- Data evaluation: uncertainties and and correlations
- Comparison of recoils - physics implementation in *TALYS(CEA-DAM) and GNASH(LANL)*

1. Experiments using GEANIE at LANSCE

BYGMAC active target
^{238}U (^{235}U)
Developed in BIII
(Nucl. Instrum. Meth. **A490**, 559 (2002))



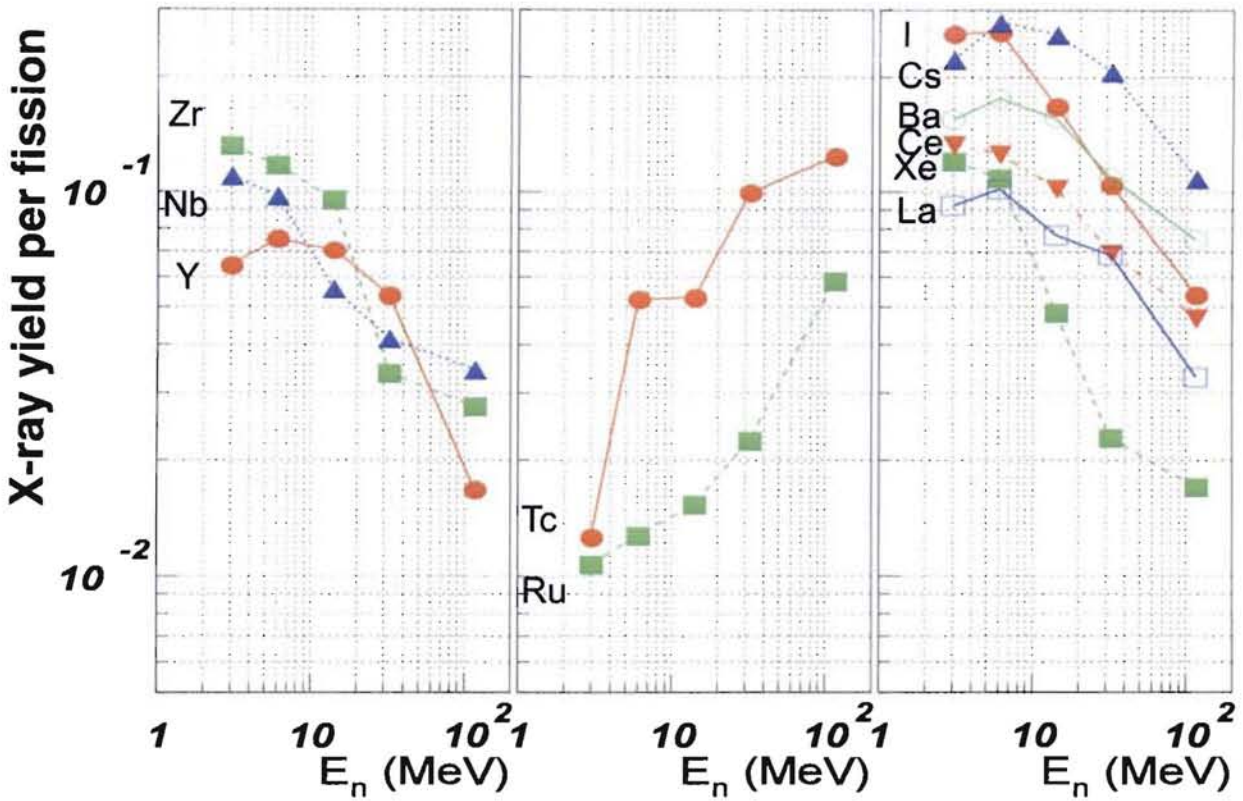
Detection of one fission fragment
- DAQ triggering
- Incident neutron energy measurement



- 26 Ge detectors (15 & 11 X)
- 15 keV < E < 9 MeV
- E/E ~ 1/1000
- $_{tot}$ ~ 1% (E=1.33 MeV)

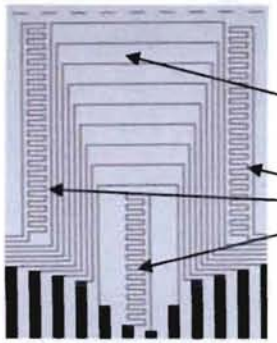
X-ray yields in $^{238}U(n,f)$

- Variation as a function of E_n



Multiple magnetic gauge package

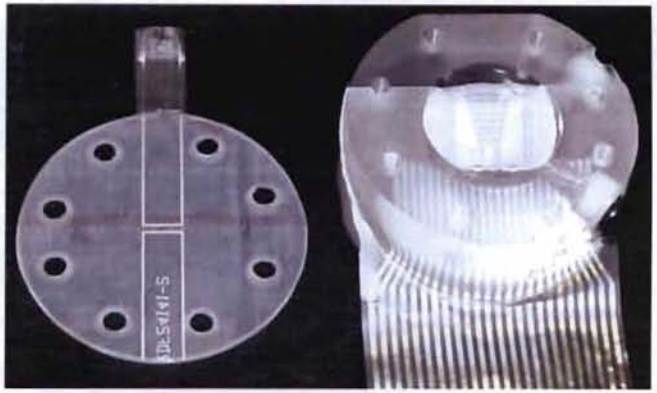
Gauge Membrane



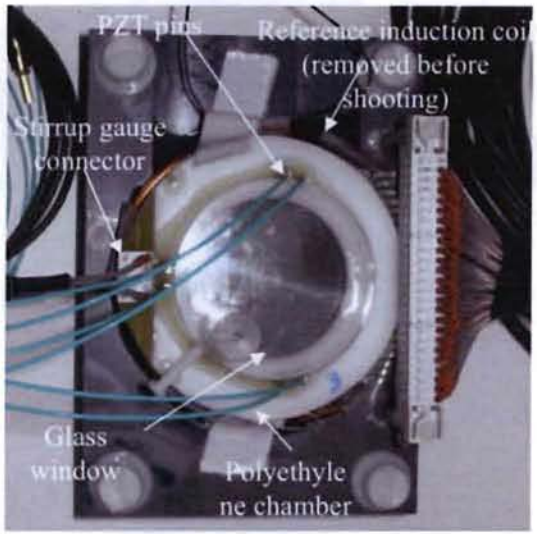
9 Particle Velocity (u_p)

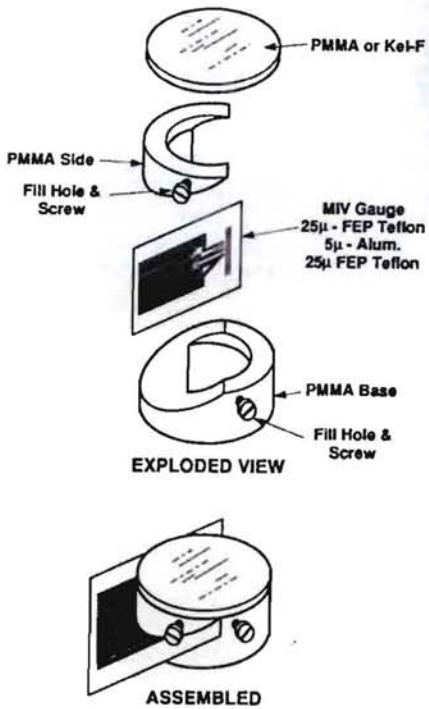
3 Shock Trackers (U_s)

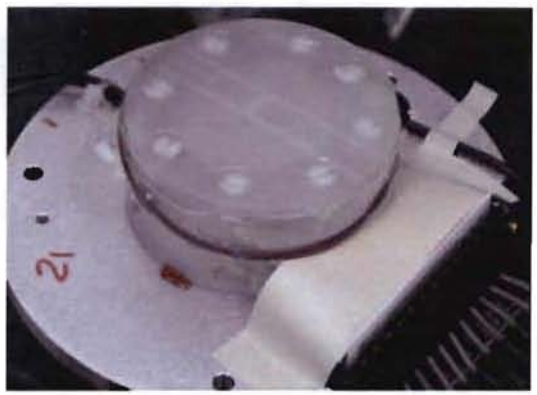
LANL Liquid Cell - Front



CEA Liquid Cell - Back







Technical Scope within the Agreement

- Technical discussions in most recent General Meeting (Mar 2009)

Topical Area	Reports	New Proposals
Nuclear Physics	11	4
Atomic Physics	1	0
Shock Physics	6	2
Materials	3	0
High Explosives	2	1

- We have discussed the desire and opportunity for more collaboration in a broader array of Materials projects
- Supporting sciences relevant to Nuclear Energy (materials, nuclear reactions and cross sections); Global Security (attribution-relevant nuclear physics, materials, etc); others
- This was discussed at the Mar 2009 meeting, and will be taken up by the Steering Committee (May, 2010)

Looking Forward

- LANL values our collaborations with the CEA in this basic science arena
- We have not been taking full advantage of the opportunities that this agreement presents
- Propose to continue to collaborate heavily in nuclear physics, find ways to enhance the collaborations in plasma and atomic physics, and to extend our collaborations in condensed matter and materials