US Nuclear Data Program: LANL T-16 FY03 Progress

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Homeland Security

- **Help lead & create new USNDP/CSEWG Homeland Security Committee for Nuclear Data**
- **Member of Peter Bond's APS/DNP Committee on Homeland Security – helped focus the community on these issues, advertised capabilities within the NP community, and organized HS session at APS meeting**
- **Made progress in contributing to NNSA/NA22 & DHS (hopefully) arenas**
- **Use CSEWG resources to strengthen reaction data products**
- **LANL/T-16 projects: Attribution; Neptunium; HEU detection with photofission; and collaboration with BNL on explosives detection with photonuclear resonances.**

Nuclear reaction cross sections for ENDF/B-VII

- 232-241U, 239Pu, 237Np, 241Am, …. & more, with improved fission, capture, n,xn, energy & angle distributions, & prompt and delayed fission neutrons; photonuclear data.
- Excellent results in critical assembly data testing, & solved some long-standing problems
- Participated in IAEA/CSEWG Standards activity, and played a lead role for certain areas
- New suite of light nucleus ENDF evaluations, for charged-particles and neutrons, important for astrophysics

Nuclear astrophysics data (Hale)

- Extend N-N analysis to higher energies and provide evaluated n-p data:
New polarization data were added to analysis; capture/photodisintegration reactions were extended to 50 MeV neutron energy; n-p cross sections are being used in preliminary ENDF/B-VII evaluation work.

- Perform analyses of other processes important to BBN, and provide S-factors and reaction rates: Cross sections for many BBN reactions were sent to NNDC; reaction rates are also available in local files.

- Continue to contribute to the TUNL Energy Levels of Light Nuclei project:
A=5-7 article has been published; no new work in FY03.

- Continue analyses of reactions involving radioactive light isotopes, including 17F+p, and possibly other reactions being measured at ORNL:
18Ne analysis has determined the 14O(alpha,p) rates with much greater certainty than previously; final refinements of the analysis are being made for publication.

Nuclear astrophysics data (Moller)

- **Moller completed new fission model that includes axial asymmetry, & calculated > 1000 neutron-rich barriers, for r-process termination; Database is being made available.**

- **Moller completed new beta decay code, using statistical Gross theory for FF transitions, with allowed transitions using a QRPA model.**
  - beta decay, Pn, & T1/2 data put on T-16 WWW site

- **Work presented at numerous invited talks at conferences (JAERI, Jan 2003; Tours, Aug 2003, …) and in PRC and PRL articles.**

Model code development, and reaction calculations

- **McGNASH development continues (Talou talk); Cooperation with other code developers via our leadership of the NEA/WPEC Subgroup A.**

- **Collaboration with LANSCE/GEANIE experimentalists**
  - new evaluations for n+89Y and n+193Ir completed, and role of isomers determined. (BNL collaboration useful here)

- **New 238U prompt neutron spectrum completed by Madland, and compared with new LANSCE/FIGARO measurements**