LA-UR 13-

Overview of LANL Evaluation Work and Plan

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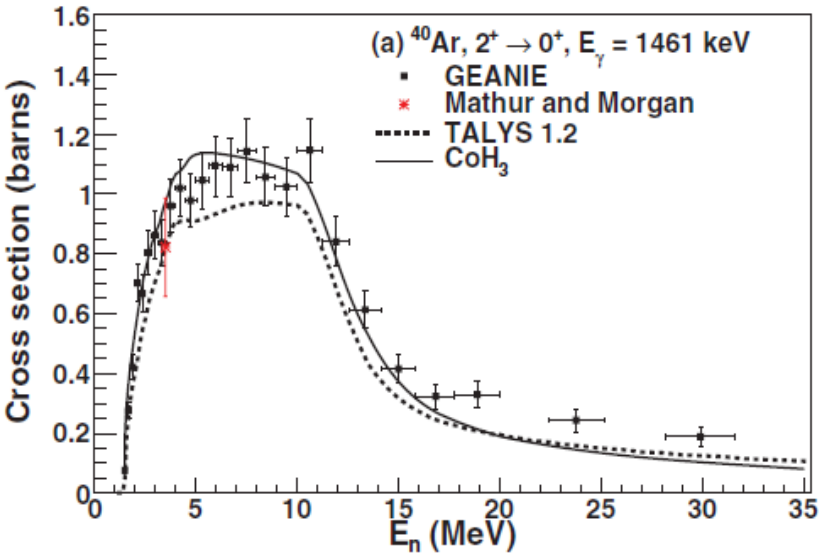
BNL GForge Repository Changes by LANL

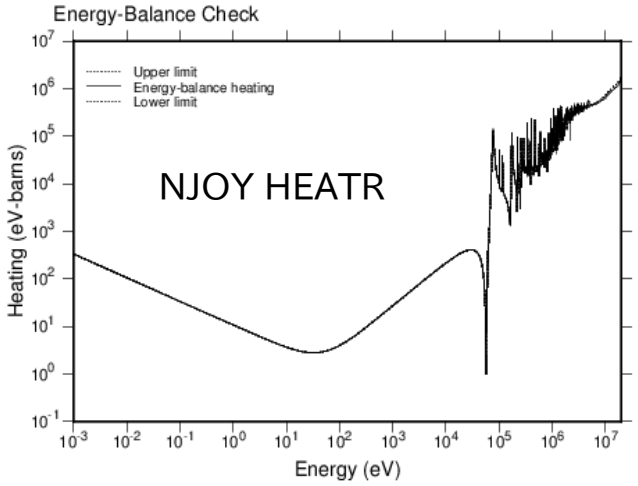
- H-1
  - Hale's R-matrix analysis fully adopted from 0 to 20 MeV
  - Some confusing things happened - covariance data
    - COMMARA-2.0 coarse grid data stored temporarily
    - Hale produced fine grid data in 2008
    - But nobody replaced ENDF by Hale's new covariance
- Ar-40
  - New evaluation above resonances, based on GEANIE data
- Ni-58, 59, 60, 61, 62, 64
  - New evaluations above resonance regions, with CoH3
- Np-236m
  - New isotope, new evaluation
    - 60 keV level, half-life of 22.5h

Ar-40 Evaluation

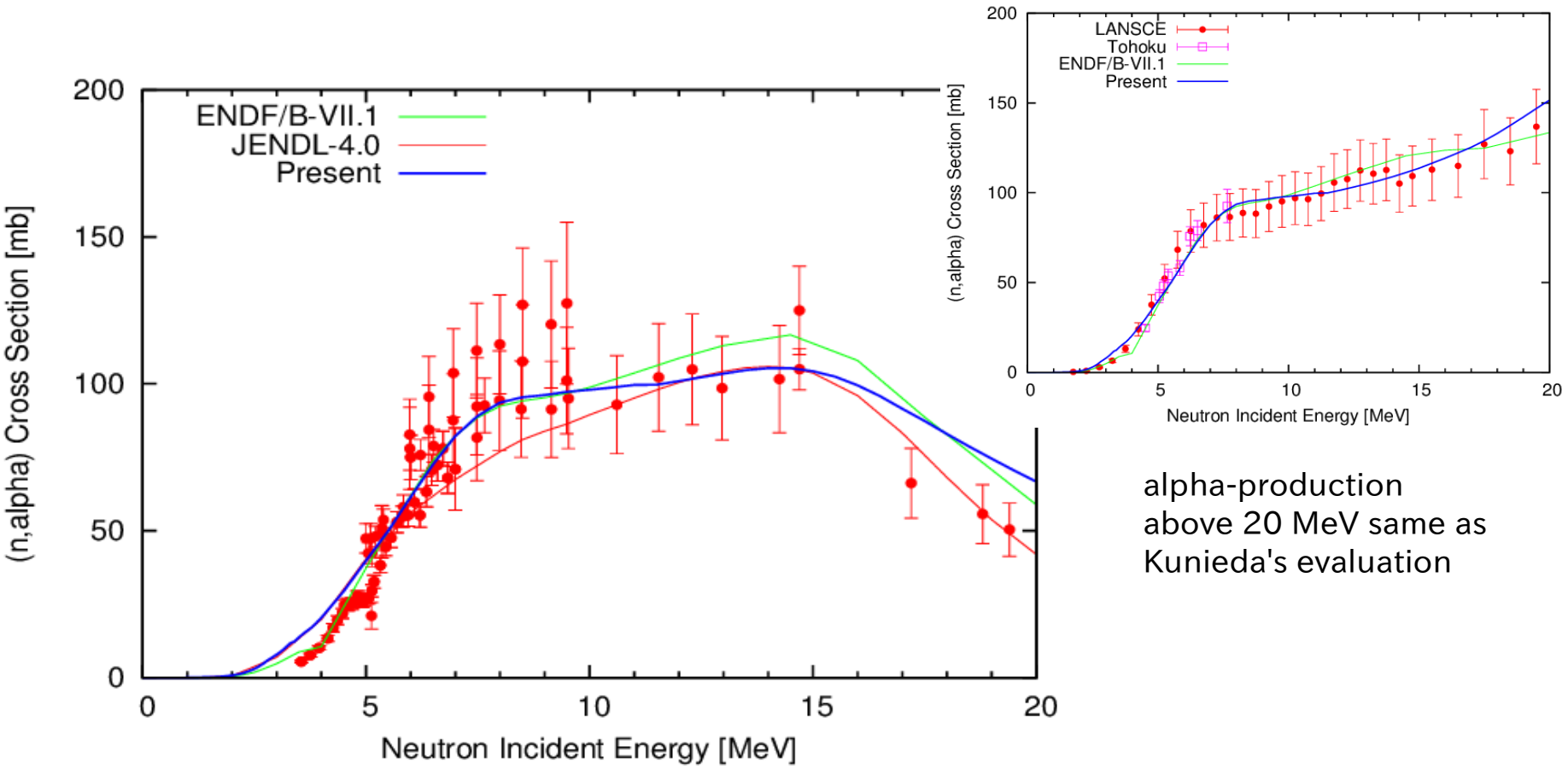
- **ENDF/B-VII.1 Ar40 = JENDL-3.2 evaluated in 1994**
  - New GEANIE data available [S. MacMullien et al. PRC85,064612 (2012)]
  - TUNL new (n,p) data
  - Issue of EPMAX > Q-values; particle energy spectra given in MF=5



- **New evaluation with the CoH3 code**
  - Resonance (JENDL-3.2) up to 1.5MeV
  - Cross sections were fitted to available experimental data
  - Angular and energy distributions were re-calculated for better energy conservation

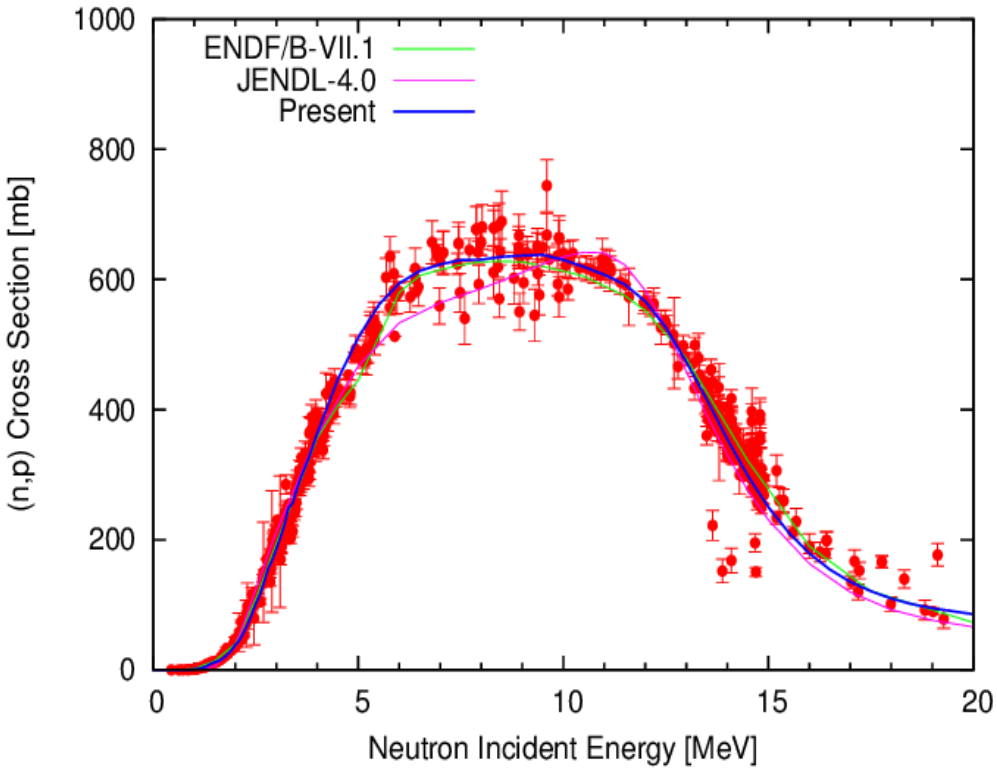


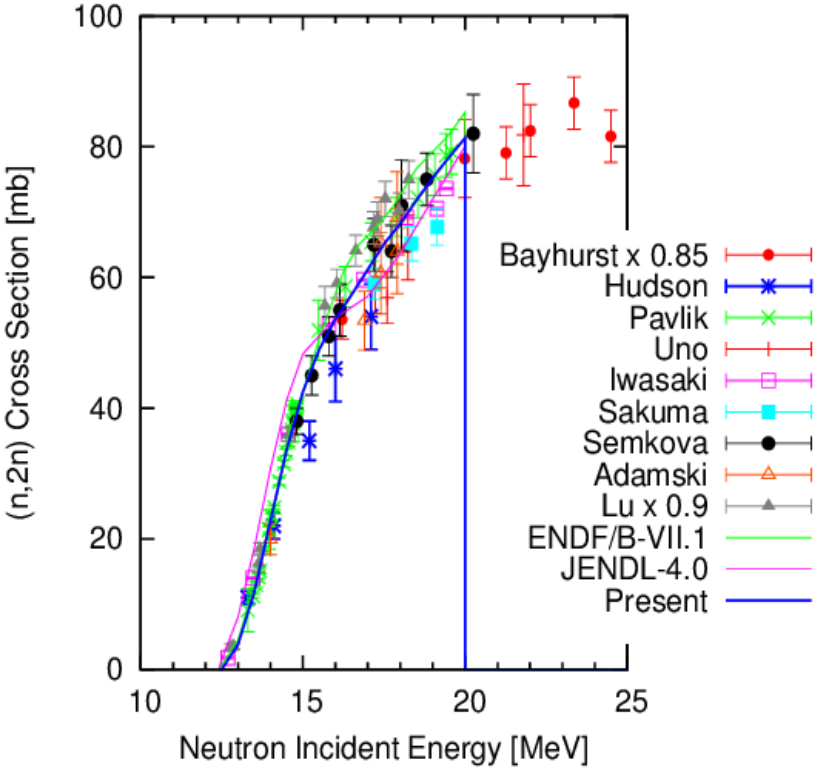
Ni-58(n,alpha) Reaction Cross Section



alpha-production above 20 MeV same as Kunieda's evaluation

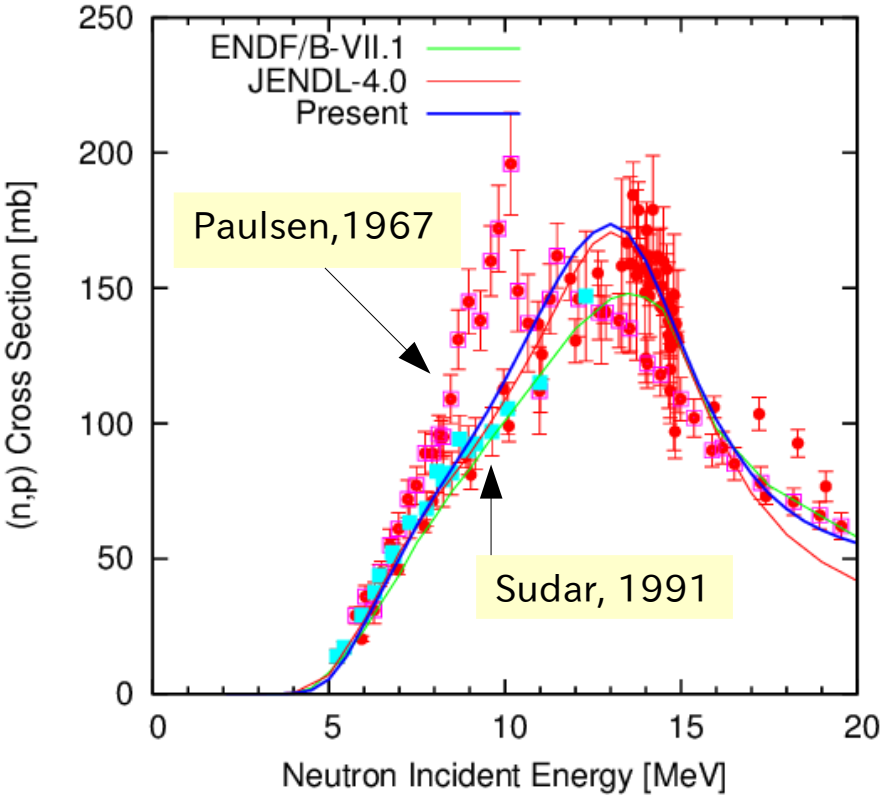
Ni-58(n,p) and (n,2n) Reaction Cross Sections

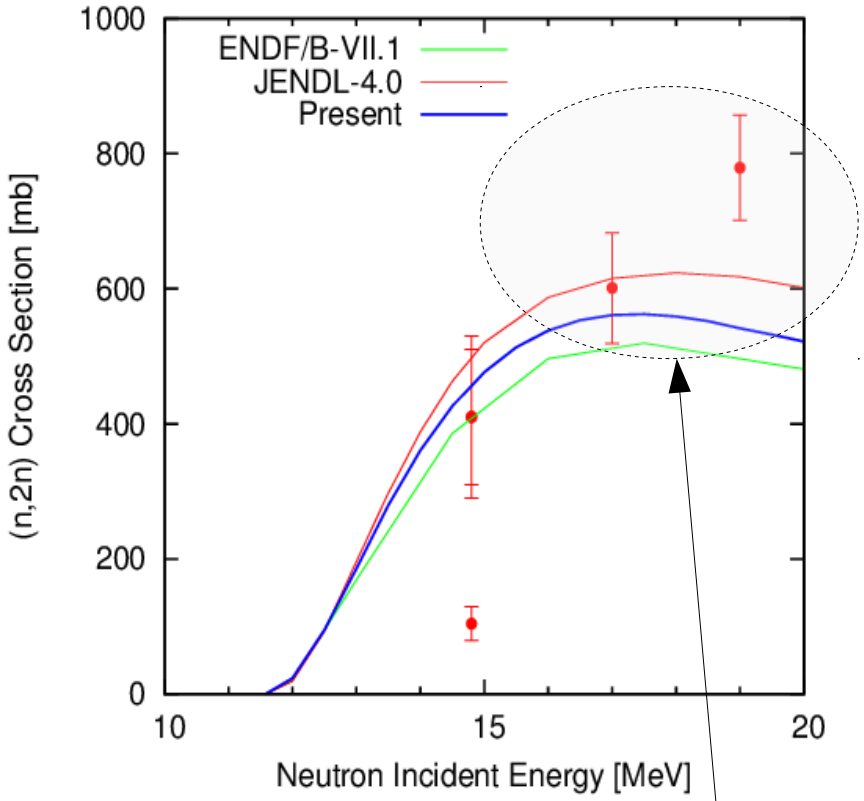




IRDF2002 is the same as ENDF/B-VII (VI)

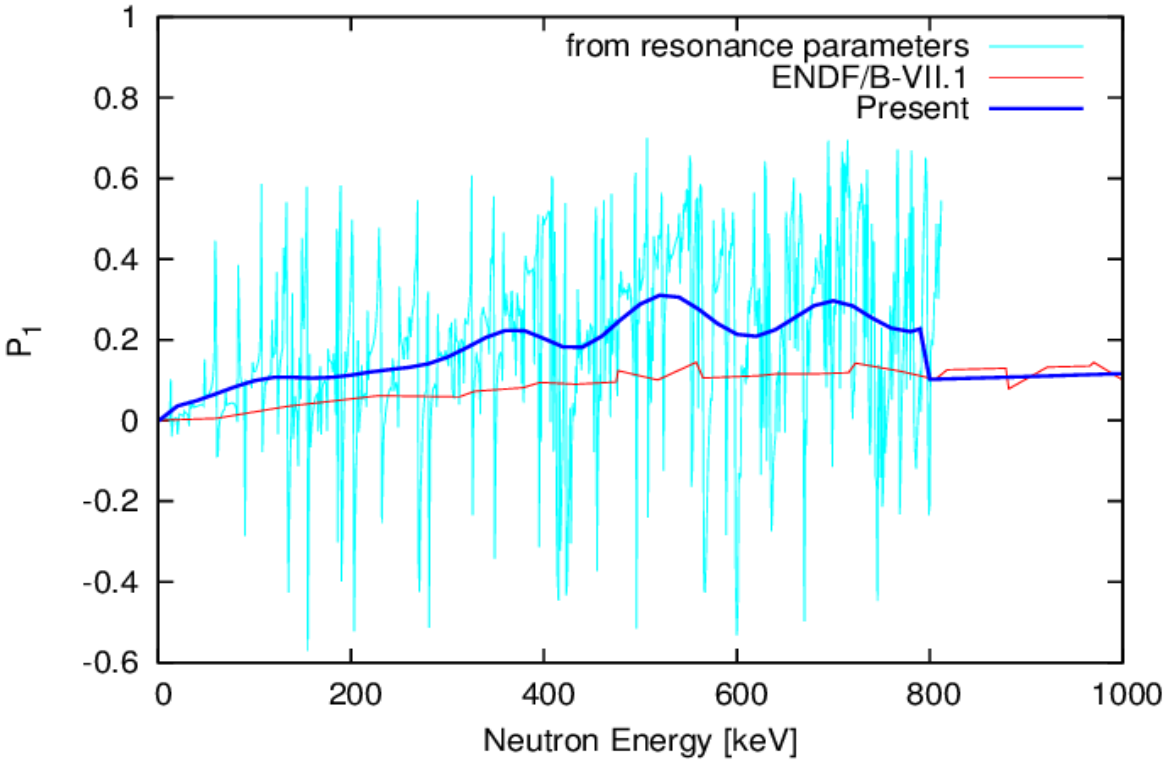
Ni-60(n,p) and (n,2n) Reaction Cross Sections





Mass spec data by Wallner, increasing

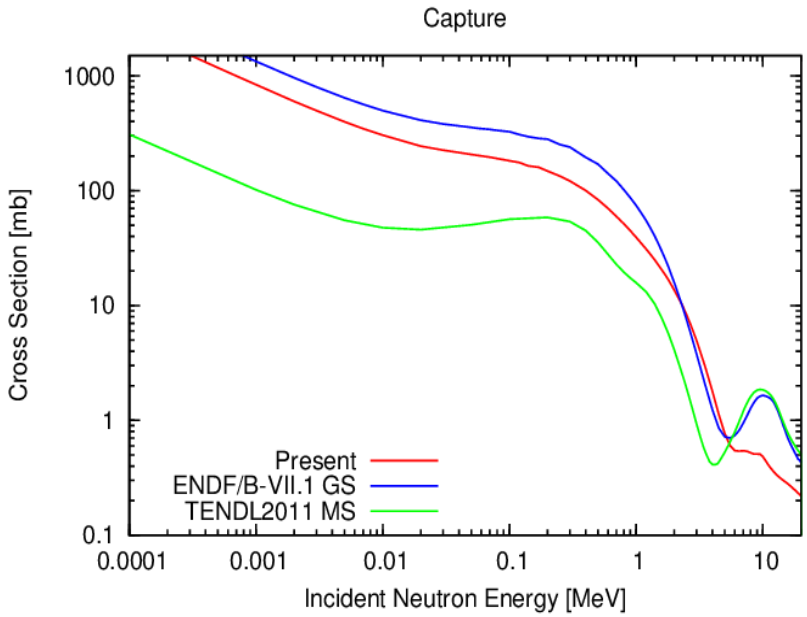
Elastic Scattering Angular Distribution

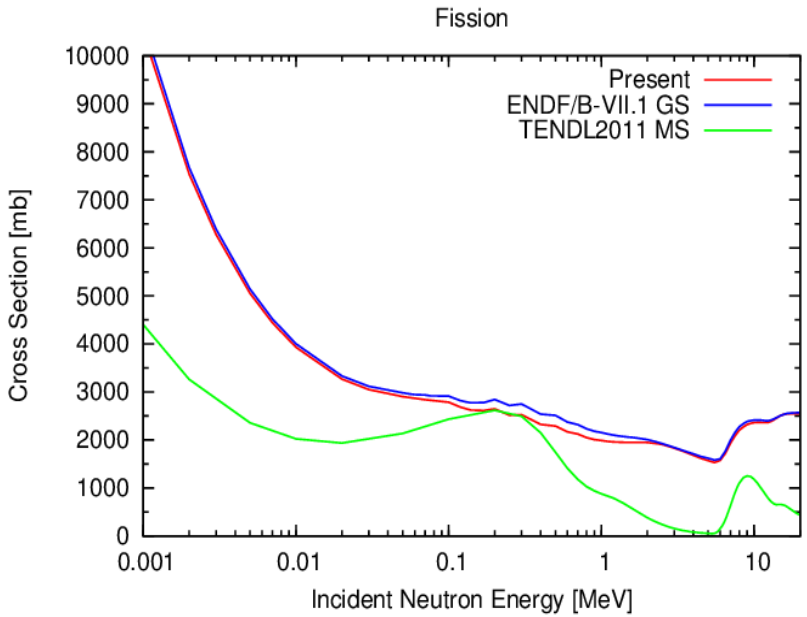


- **Elastic scattering angular distributions at low energies**
  - Reconstructed from R-M resolved resonance parameters using BB formula, and smoothed
  - Ni58 and 60 only
  - Produced more forward-peaked scattering ang. dist.
  - Method developed under WPEC/SG35 enables us to go beyond RRR

Np-236m Evaluation, Excitation Energy of 60 keV

- **Short-lived actinides in isomeric state**
  - CoH3 calculation adjusted to JENDL-4 Np236g data
  - Change the target state into the first excited state
  - Differences mainly come from different spins



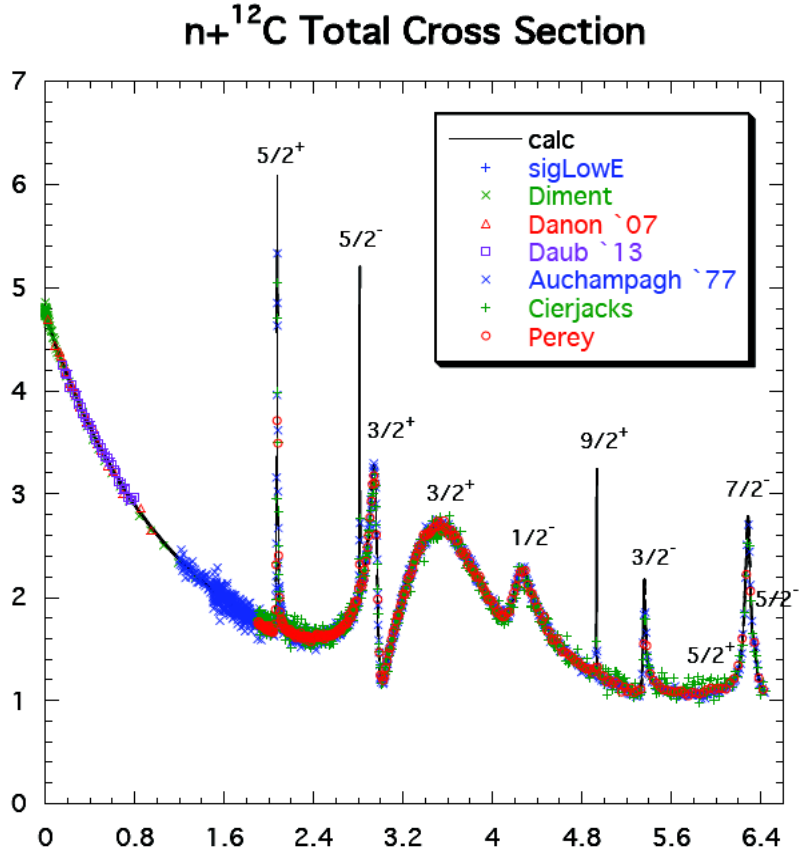


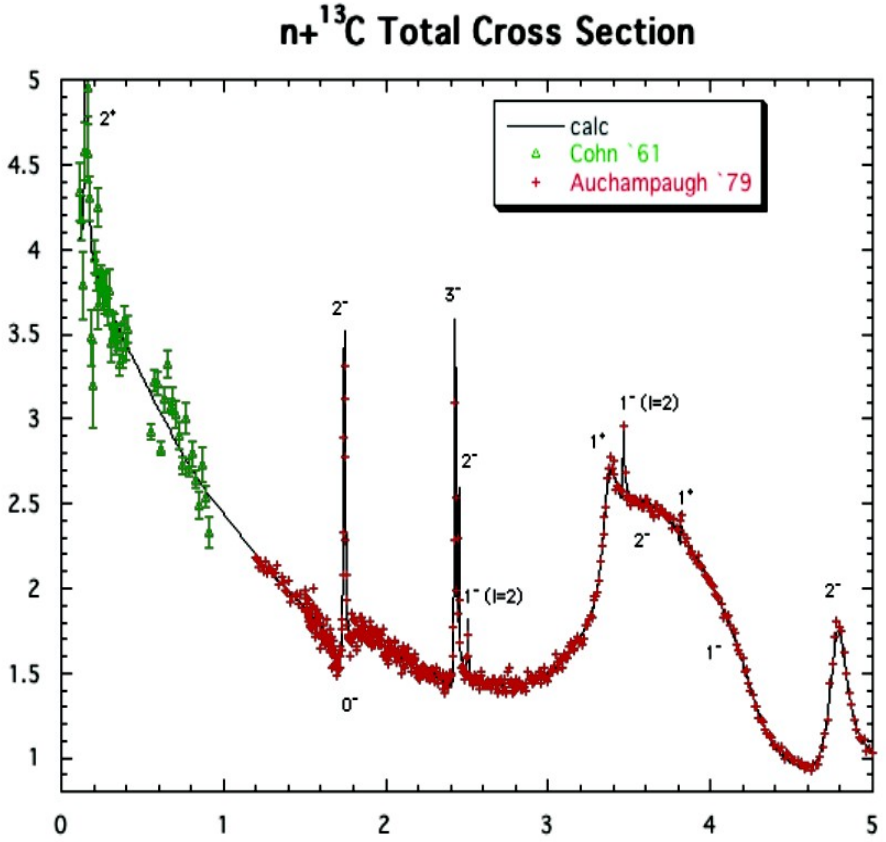
LANL new LDRD/DR, nuclear reactions on isomers

New Works, Not Yet Submitted, or Planned

- **Cross section evaluations**
  - Isotopic evaluations for carbon (G. Hale, M. Paris)
    - separate R-matrix analysis for C-12 and C-13
    - work close to final
  - O-16 evaluation for Cielo (G. Hale, M. Paris, S. Kunieda)
  - Cu-63 and Cu-65 (M.G. Bertolli, T. Kawano)
    - GEANIE measurement [M.S. Boswell, et al. Phys. Rev. C 87, 064607(2013)]
    - on-going new evaluation work based on CoH3 calc. for GEANIE data and all other experimental data available
- **Prompt fission neutron and gamma-ray spectra**
  - CGMF, Monte Carlo Hauser-Feshbach for fission fragment decay
  - Los Alamos (Madland-Nix) model in CoH3
  - See P. Talou's talk
- **Uncertainty quantification work**
  - Re-analysis of experimental uncertainties of prompt fission neutrons
  - See D. Neudecker's talk

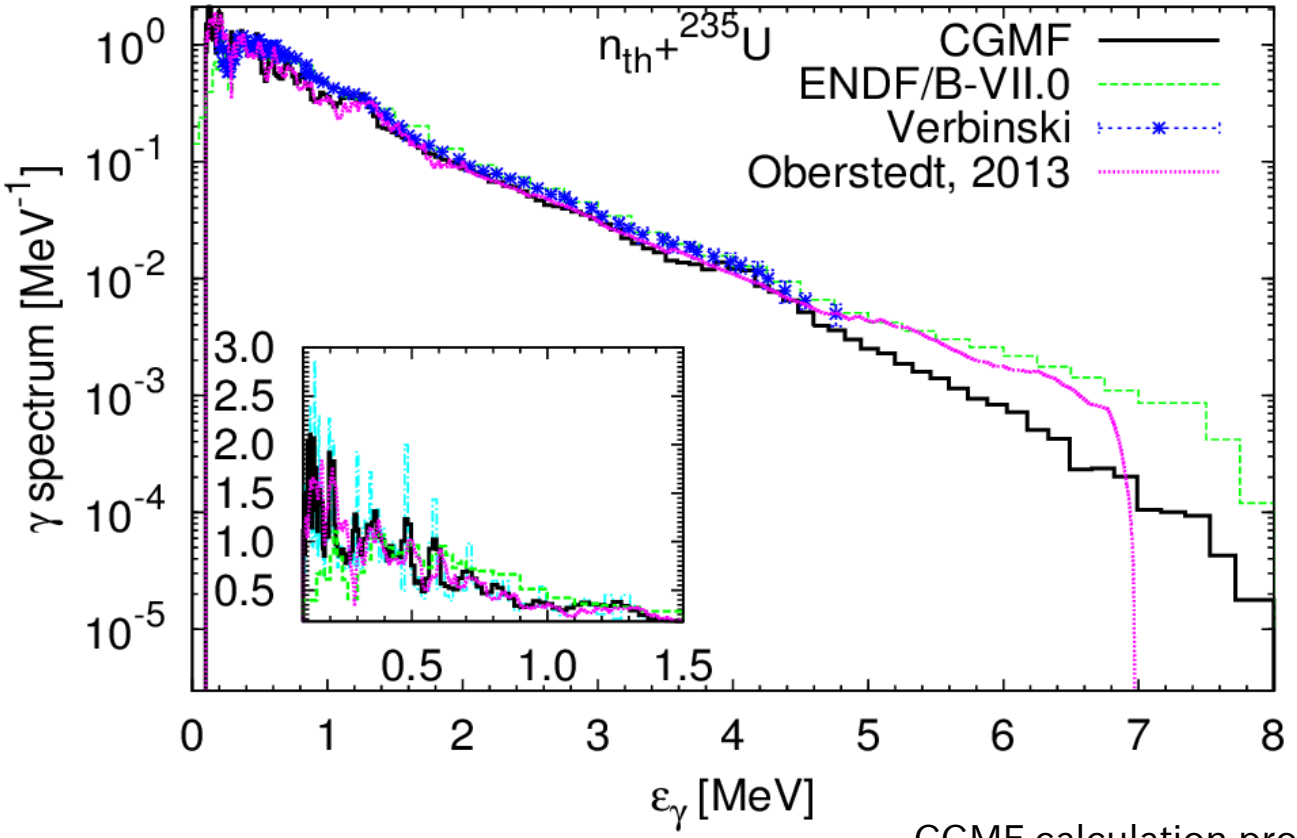
C-12,13 Total Cross Section, R-Matrix Fit





C-nat. will be reconstructed for Standards Evaluation

Prompt Fission Gamma-Ray Spectra



CGMF calculation produces individual gamma-lines from specific fission fragments