

# LANL Report

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# Program Overview, Theory and Evaluation

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## ENDF/B-VII

- Improved cross sections for actinides, based on better physics modeling, new experimental data, and integral data validation
  - $^{234}\text{U}$ ,  $^{237}\text{Np}$ ,  $^{241}\text{Am}$ ,  $^{191,193}\text{Ir}$ ,  $^{208}\text{Pb}$ ,  $\nu_p$
- Photo-induced reaction data
- New covariance evaluations for important materials

## Code Development

- McGNASH
  - New repository set-up (LANL internal)
  - Internal  $T_j$  calculation
  - Direct/semidirect model with Hartree-Fock theory (astro-physics)
  - Fission model (underway)
- CoH
  - CC calculation on the excited states — coupled to g.s.
  - Kawai-Kerman-McVoy calculation (underway)
- ERRORJ – resonance parameter covariance processing code

# Program Overview, Experiments

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## DANCE — neutron capture

- $^{234,236}\text{U}$ ,  $^{237}\text{Np}$  (completed),  $^{242}\text{Pu}$  (preliminary)
- $^{147}\text{Sm}$  spins of resonances measured
  - Test of Porter-Thomas distribution
- $^{241,242m,243}\text{Am}$  (underway)
- Capture/fission ratio technique established

## GEANIE — $(n, x\gamma)$

- $^{203,205}\text{Tl}$  and isomers,  $^{150}\text{Sm}$ ,  $^{233}\text{U}$ , FP( $^{100}\text{Mo}$ ,  $^{130}\text{Te}$ )

## FIGARO — neutron emission

- Fission neutron spectra
  - $^{239}\text{Pu}$  in progress
  - $^{237}\text{Np}$  being analyzed
- Inelastic scattering neutron emission spectra: Mo isotopes

# Program Overview, Experiments, cont'd

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## Fission

- Fission cross section of  $^{237}\text{Np}$  completed
- Discrepancy between ENDF and JENDL in the 1–100 keV region was resolved
- Extensive analysis of covariances (with T-16)
- $^{233}\text{U}$ ,  $^{239,240,242}\text{Pu}$  (underway)

## Hydrogen and helium production

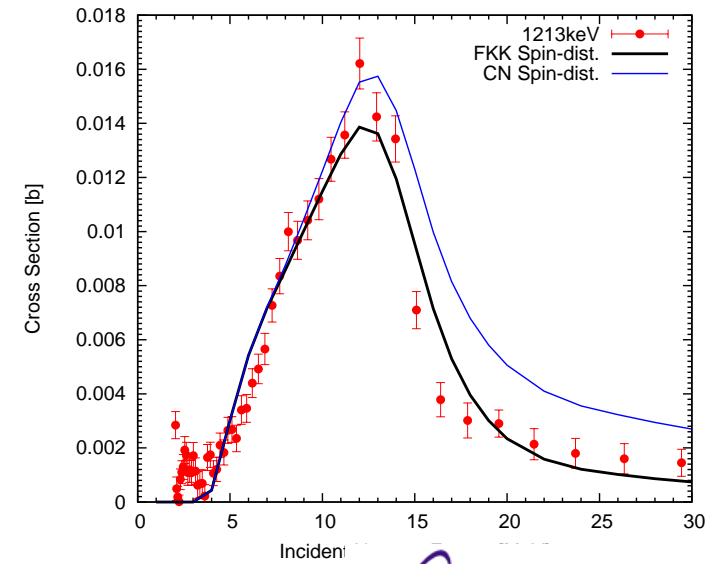
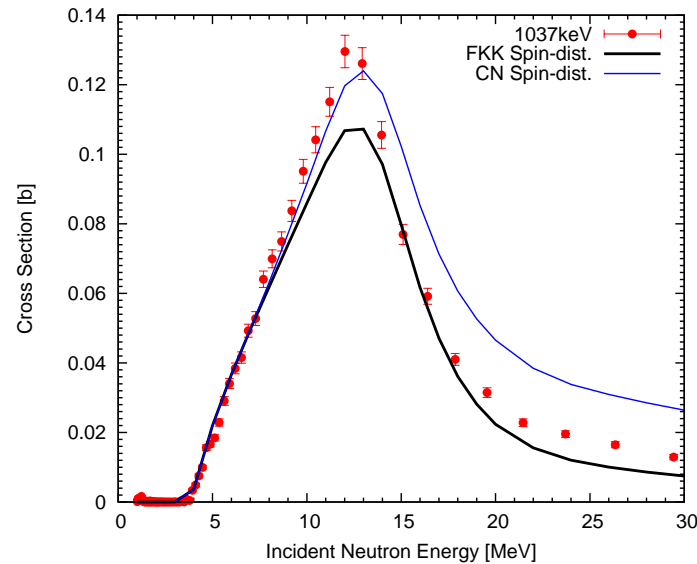
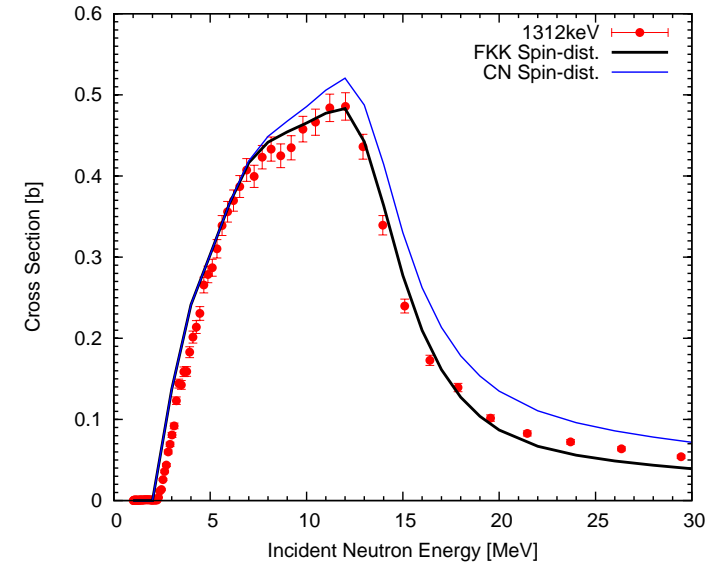
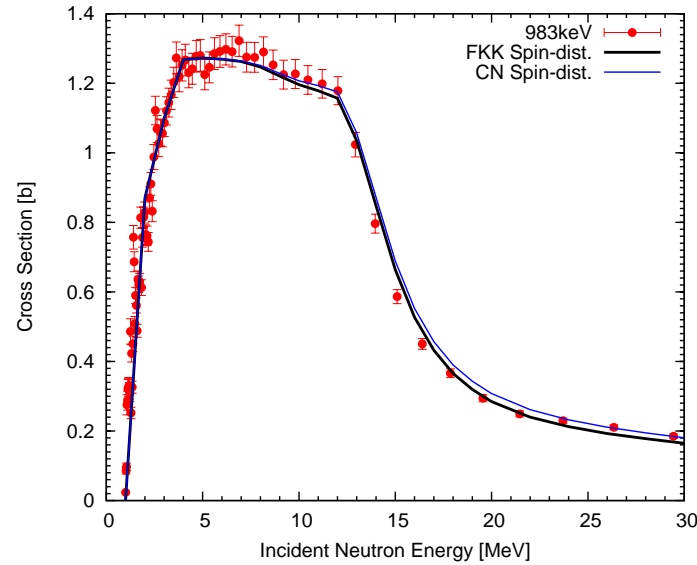
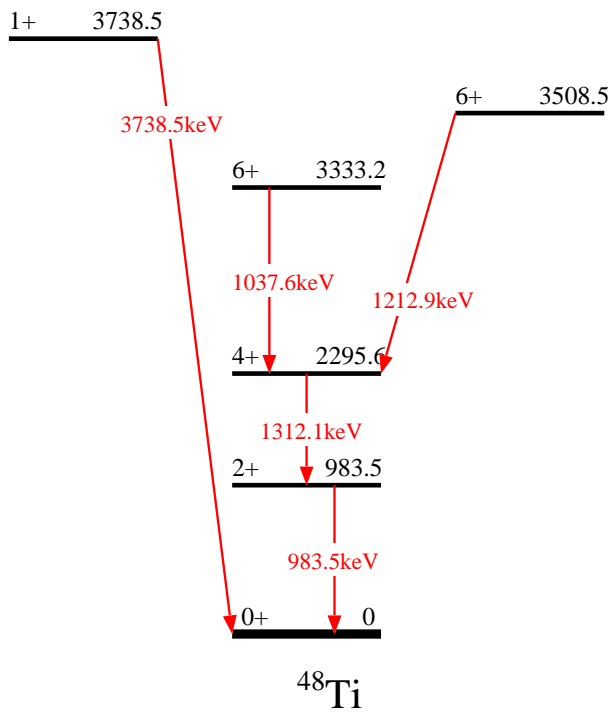
- Zr (preliminary)

## Standards

- $^6\text{Li}(n,\alpha)$  0.2 to 20 MeV
- Angular distributions and angle-integrated cross sections

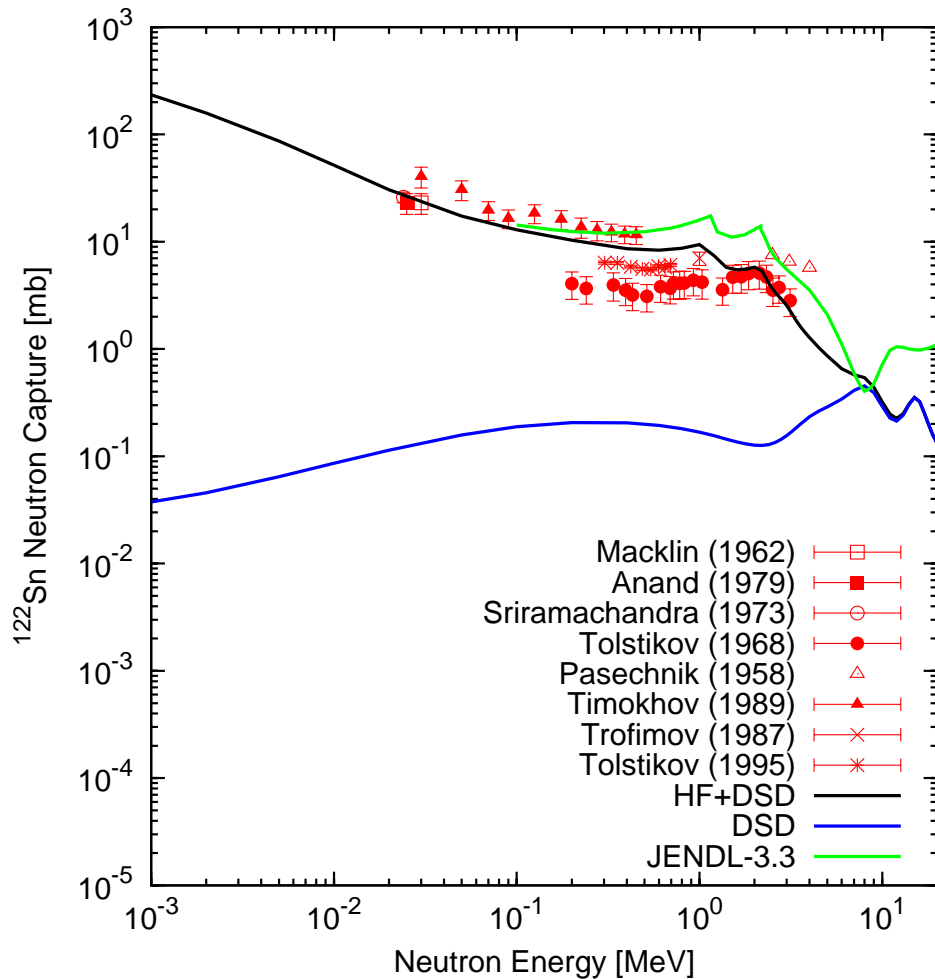
# Partial $\gamma$ -ray Production

## Analysis of GEANIE Data ( $^{48}\text{Ti}$ )



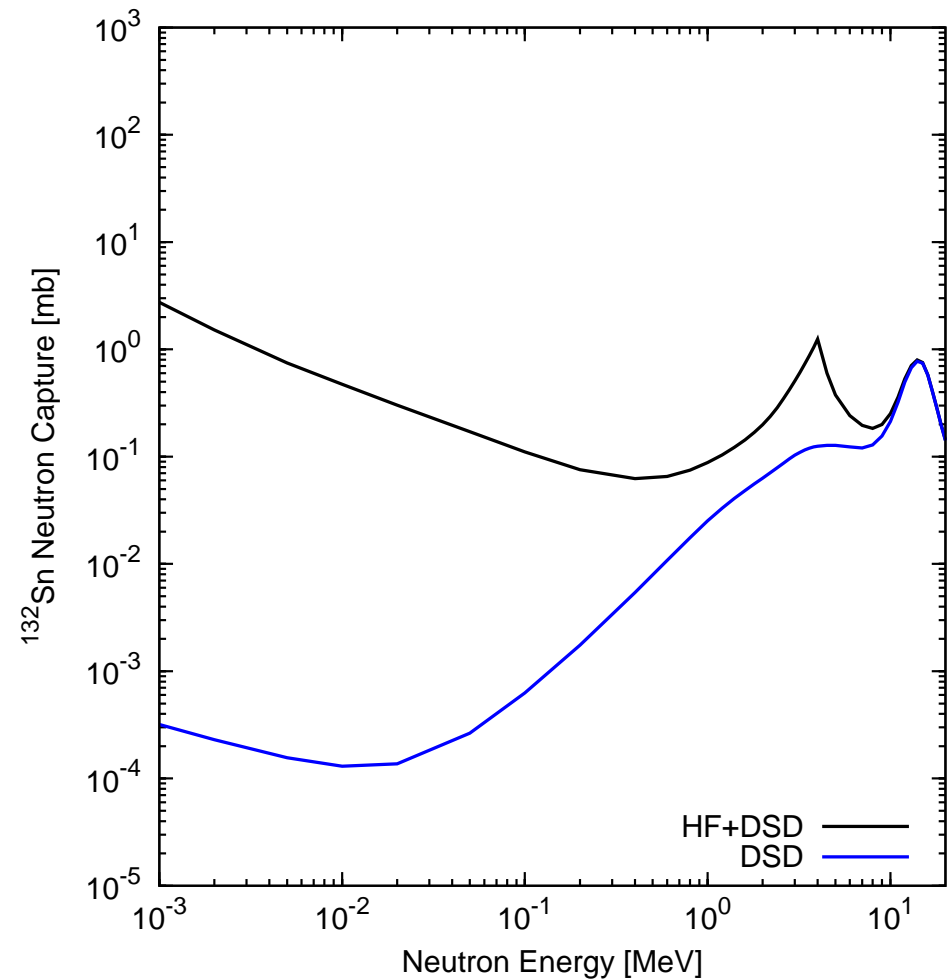
# Neutron Capture Off-Stability — Sn-122, 132

## Sn122



stable target

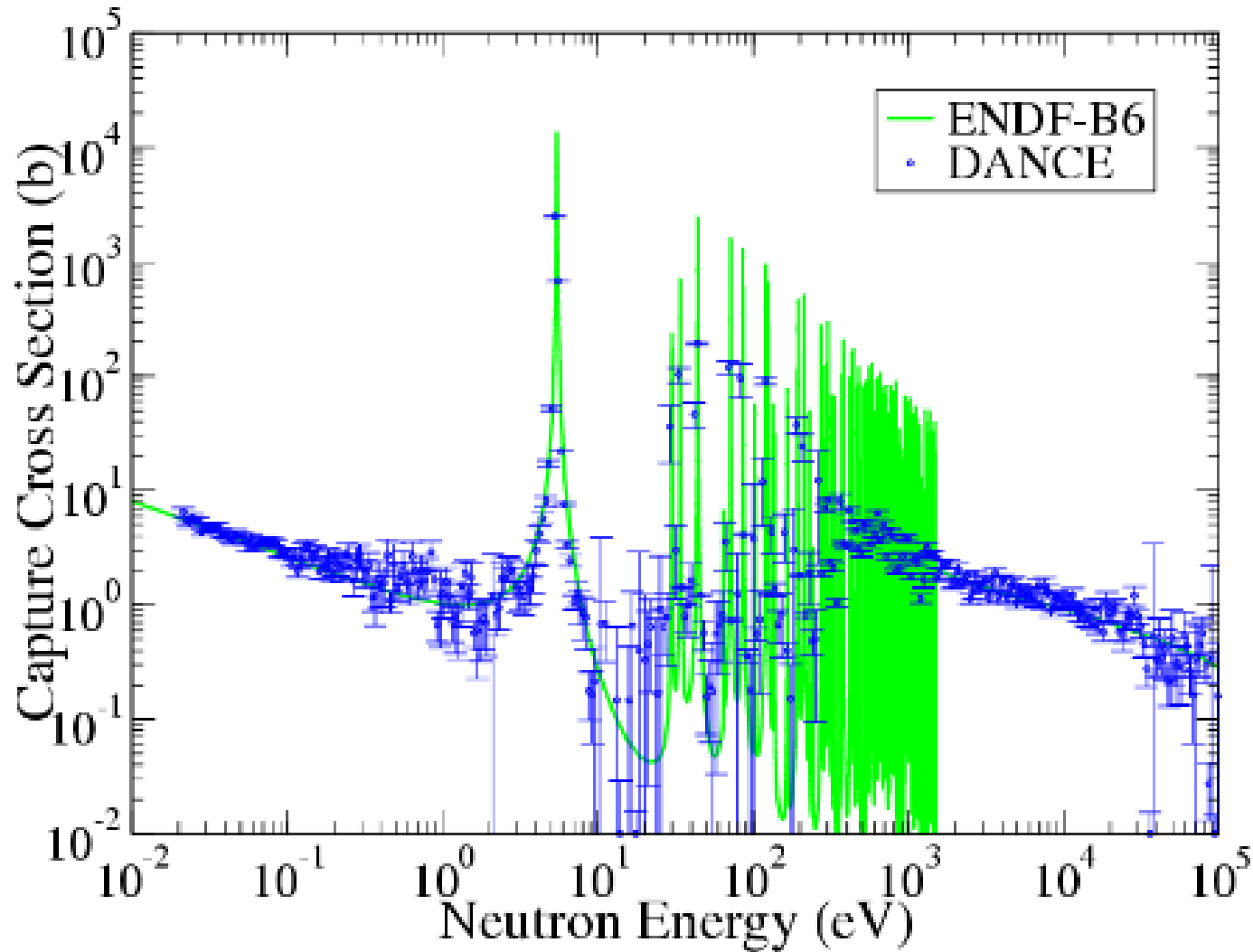
## Sn132



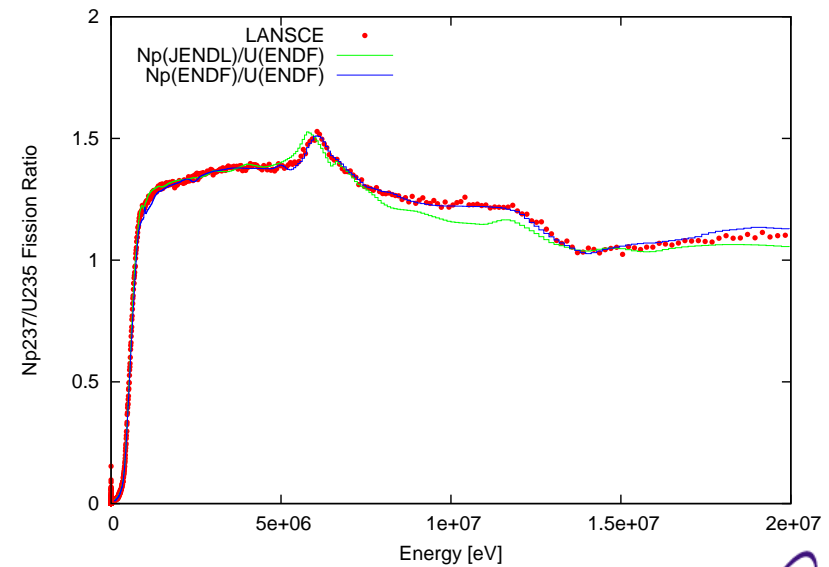
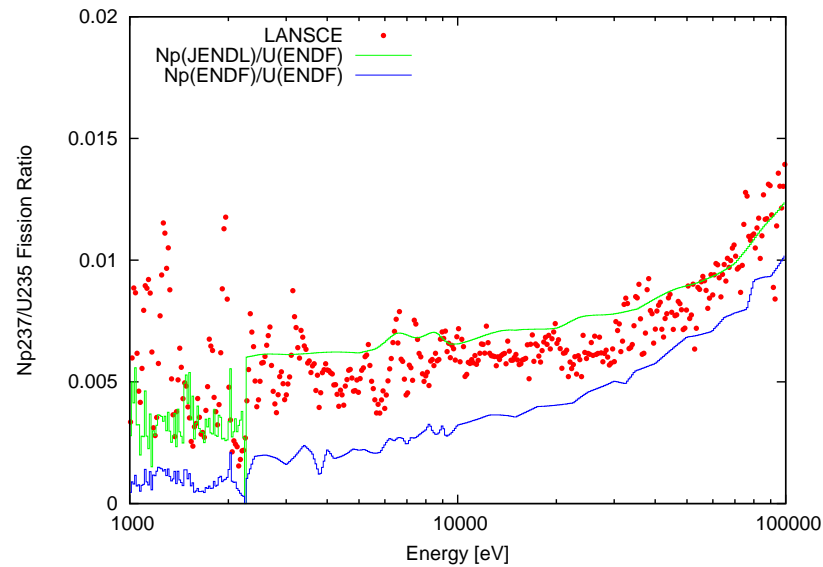
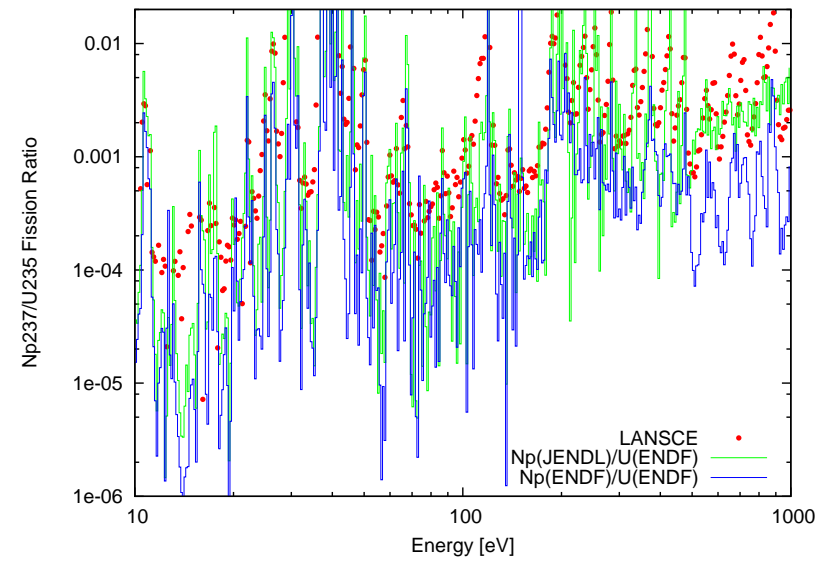
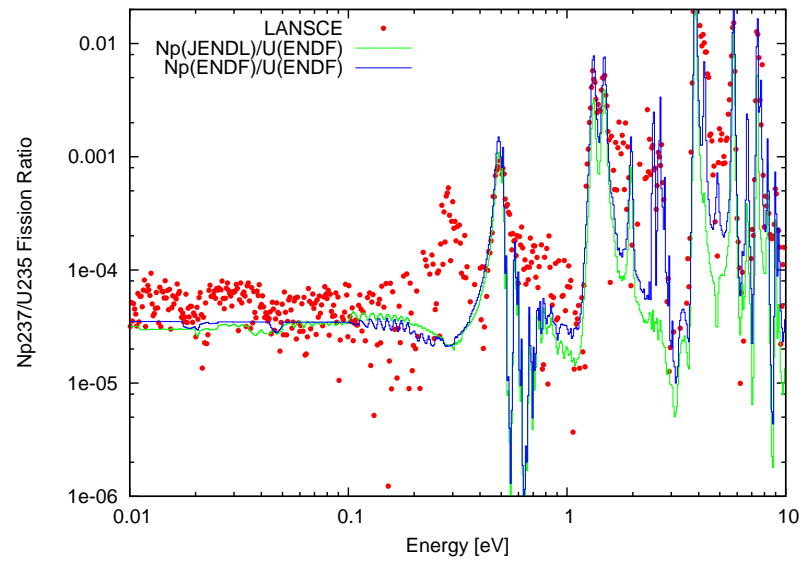
unstable, but important for r-process

# DANCE Capture Measurement

## $^{236}\text{U}$ Radiative Neutron Capture Cross Section



## $^{237}\text{Np}$ Fission Cross Section (Ratio to $^{235}\text{U}$ )





### Personnel Changes (Evaluation)

- P. Talou → CEA, Cadarache
- L. Bonneau, S. Cowell — New Hires

### Collaborations

- A.J. Koning visited T-16 this summer, worked on the americium evaluation
- G. Chiba visited T-16, developed the ERRORJ code
- continue WPEC collaborations — SG20, SG24, and SG26
- collaboration with BNL/NNDC on covariance evaluation — EMPIRE-KALMAN
- organized a workshop for SG24 at LANL