

LANL Report

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Program Overview, Theory and Evaluation

Evaluations and Theory Development

- New evaluations — $^{46-50}\text{Tl}$
- Fission barrier data by Möller et al.
- Level density calculation by H. Uhrenholt based on FRDM
- Covariance evaluations for minor actinides and light elements completed
- Calculation of neutron emission rates for astrophysics
— 1513 nuclides (PRL paper by Gupta, Moller, Kawano, accepted)
- New development for nuclear reactions on excited states

Code Development

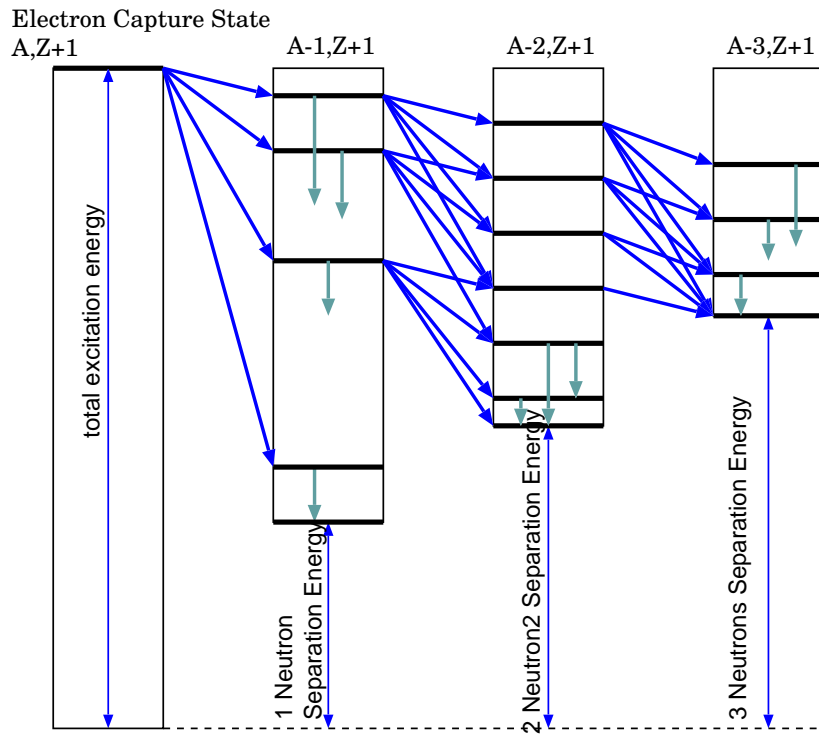
- CGM (Cascading Gamma-ray and Multiplicity)
 - Monte Carlo γ -ray cascading simulation code
 - to be extended to the full Hauser-Feshbach model
- CoH
 - CC calculation on the excited states — coupled to g.s.
 - Transmission coefficients for inverse reaction channel
- New Madland-Nix model code for prompt fission neutron emission (name ?)

Program Overview, Experiments

- FIGARO — neutron emission
 - ^{235}U and ^{239}Pu fission neutron spectra, data analysis
 - average energy estimates by S. Noda
- Gas production
 - $^6\text{Li}(n,\alpha)$ data, MeV region improved
- GEANIE — gamma-ray production measurements
 - $^{203,205}\text{Tl}(n,2n\gamma)$, ^{150}Sm , ^{186}W , etc.
- DANCE — neutron capture
 - ^{75}As , ^{89}Y , ^{143}Nd , ^{149}Sm , $^{151,153}\text{Eu}$, etc
- Fission measurement
 - Fission chamber measurements $^{240,242}\text{Pu}$
 - LSDS

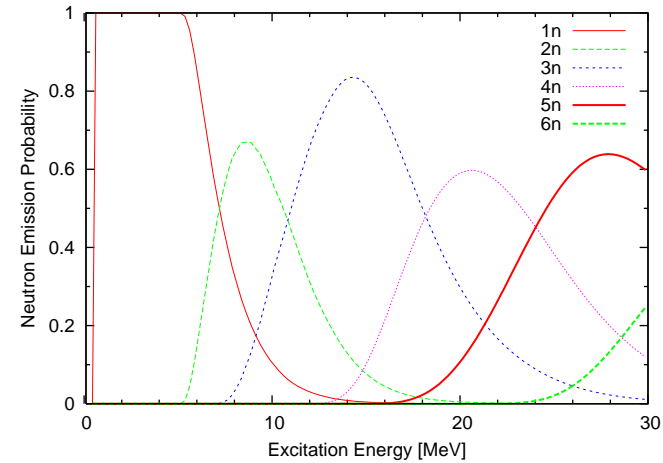
See R.C. Haight's presentation at CSEWG !

Sequential Neutron Emissions

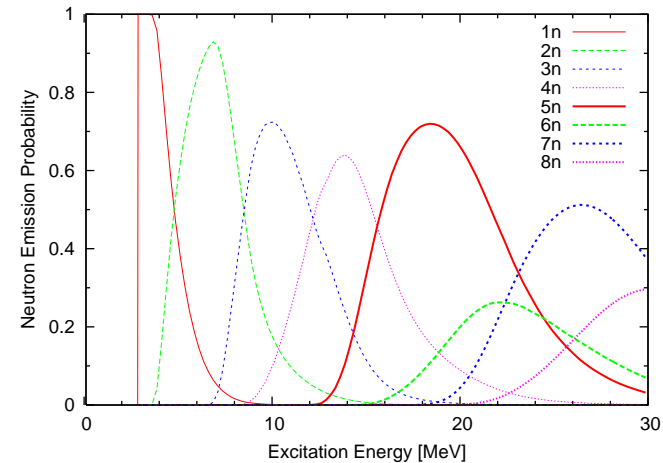


Electron capture produces a highly excited state, which subsequently decays by emitting several neutrons (very fast process).

Si-43



Sr-118

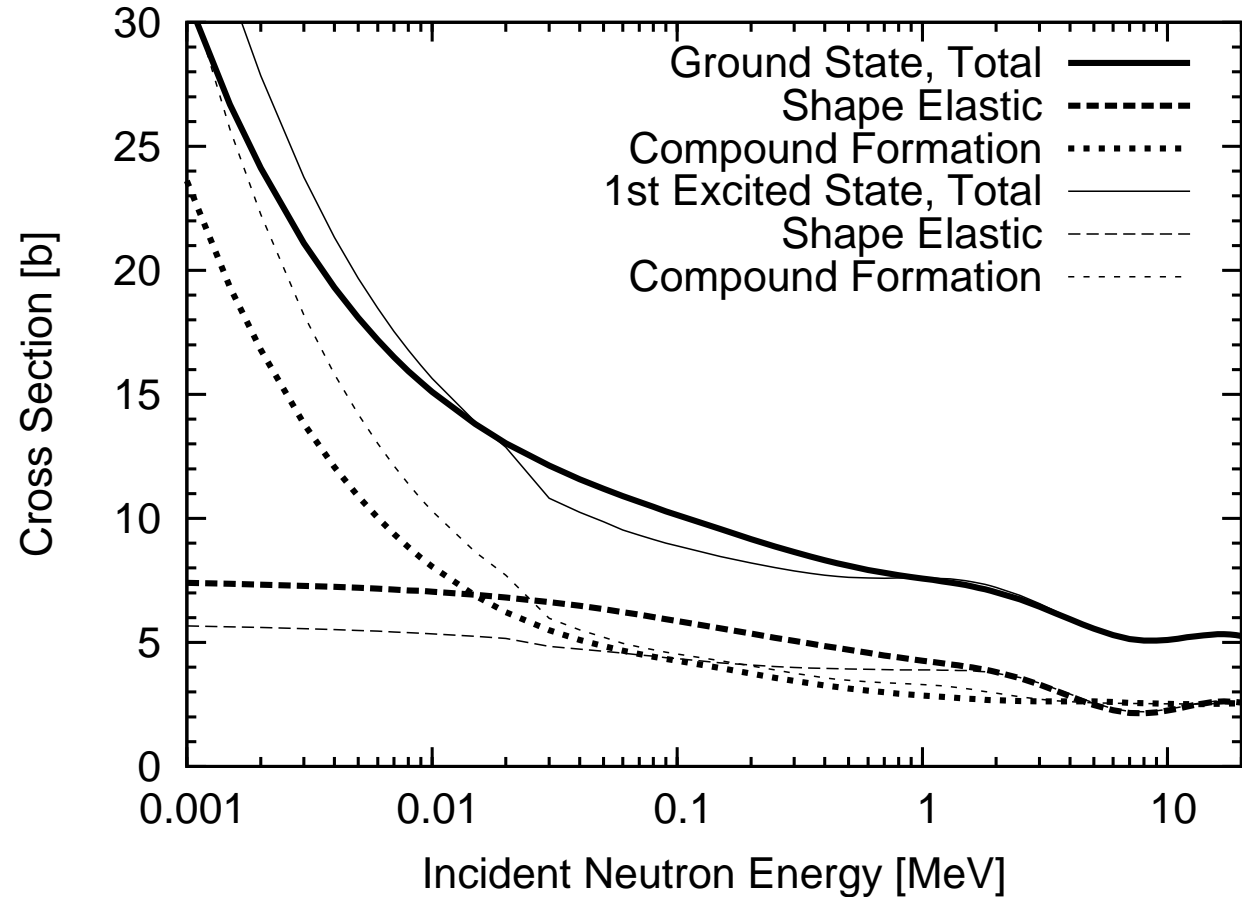
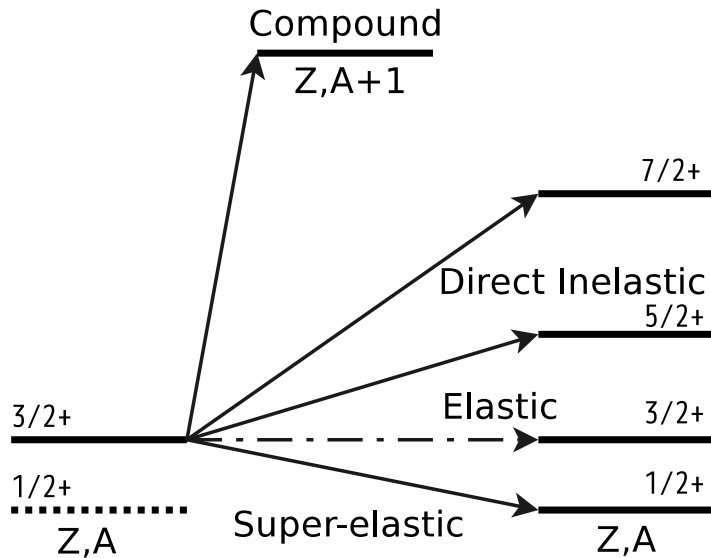


We have generated the neutron emission rate data for 1513 nuclides from ^{23}Ne to ^{166}In .

Direct Cross Sections

Coupled-Channels Calculations for the Excited States

Calculation for $n + {}^{169}\text{Tm}$

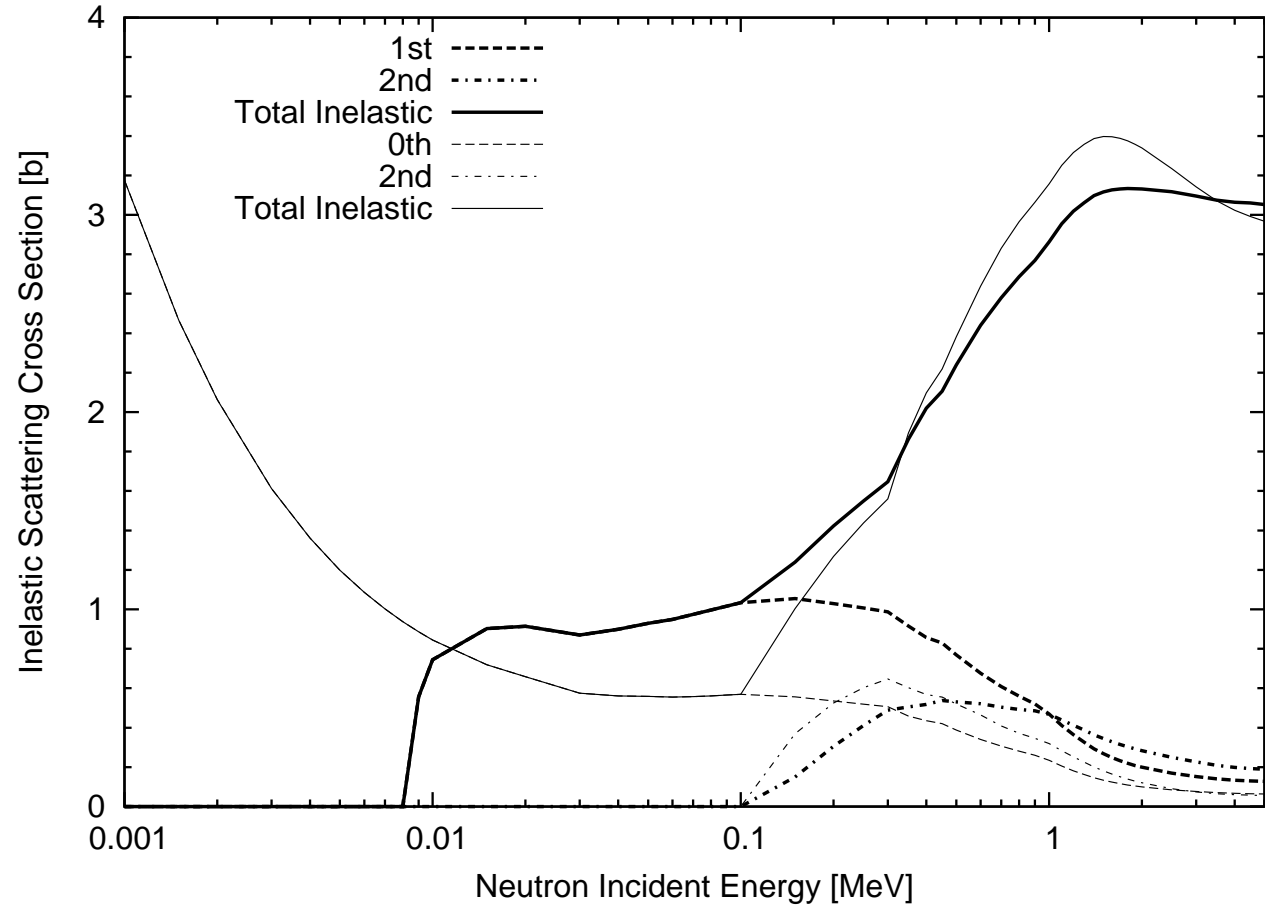
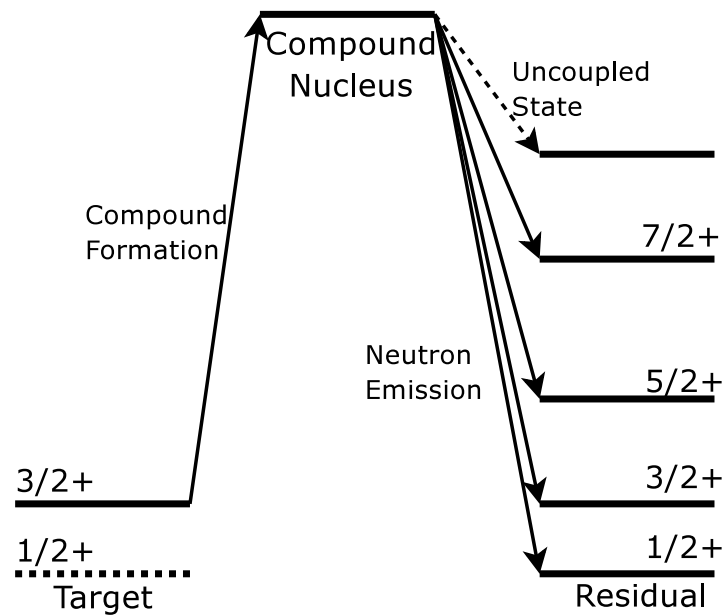


Preliminary

Inelastic Scattering Cross Sections

Hauser-Feshbach Calculations for the Excited States

Calculation for $n + {}^{169}\text{Tm}$



Preliminary

Personnel Changes (Evaluation)

- O. Bouland and A. Bouland, long-term visiting staff members, from CEA, Cadarache
- R. René, graduate student from ENSICAEN, Caen
- S. Noda, Ph.D. candidate student from Kyushu Univ.
- T. Watanabe, new post-doc from Kyushu Univ.

Workshops

12th Int. Conf. on Nuclear Reaction Mechanisms

- Lake Como, Varenna (Italy), Villa Monastero, June 15 – 19 (2009)
 - Nucleon and nucleus response to hadronic and electromagnetic probes nucleon correlations / Exotic nuclei, radioactive beams and gamma tracking detectors / Superheavy elements / **Fission** / **Nuclear data** / Light and heavy ion reactions at low, intermediate and relativistic energies (measurements and model developments) / **Nuclear astrophysics** / Hadrontherapy / Other applications: nuclear energy, accelerator driven systems, controls for nonproliferation, space radiation protection . . .

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