

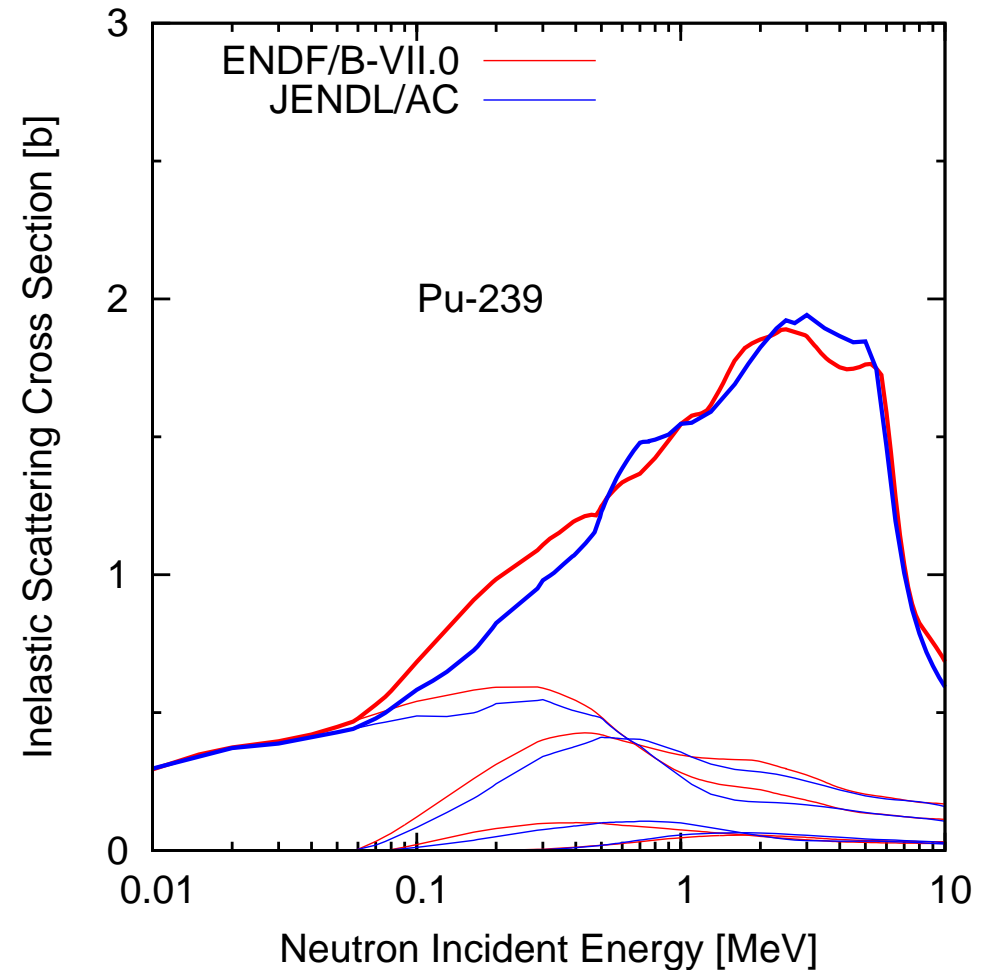
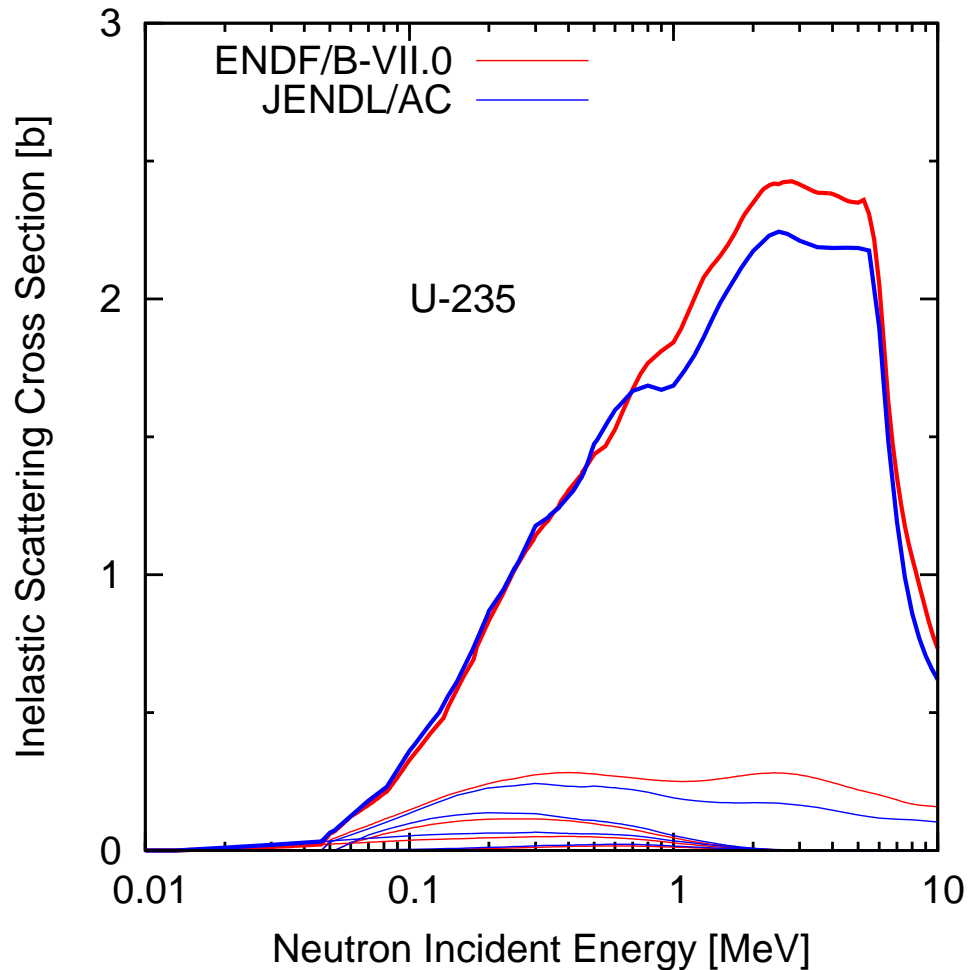
Inelastic Scattering:

Coupled-Channels – Hauser-Feshbach Method at LANL

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Inelastic Scattering Cross Sections

Comparison of ENDF/B-VII.0 and JENDL/AC-2008

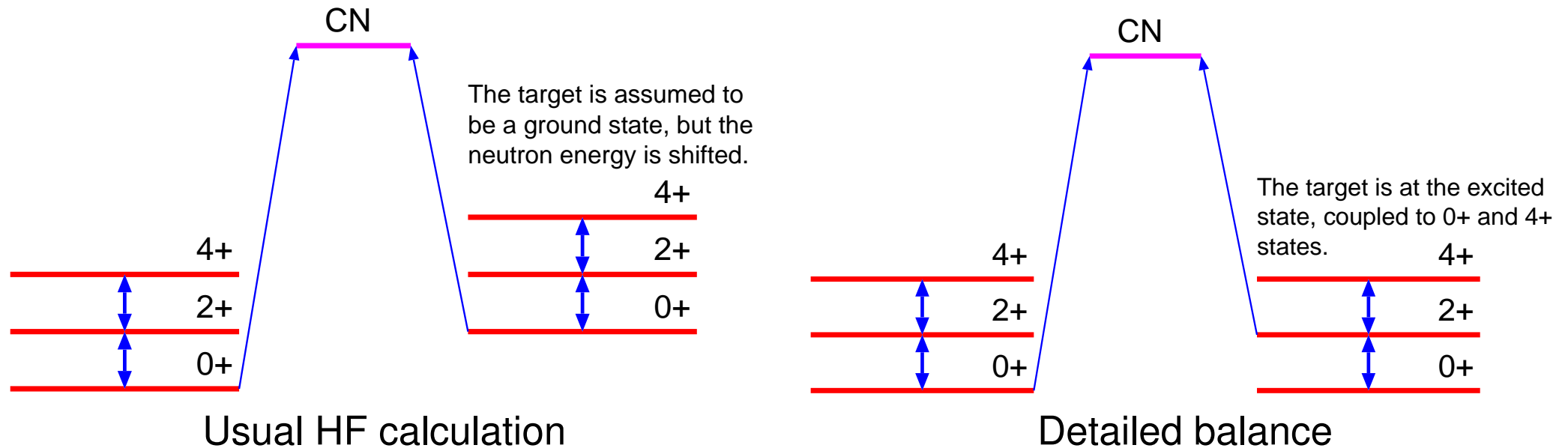


Neutron Reaction on Deformed Nuclei at Low Energies

- Incorporate Coupled-Channels (CC) method into Hauser-Feshbach formula
 - Inverse channel problem
 - What is the appropriate transmission coefficient for the excited states ?
 - Replaced by the one for the ground state (historical)
 - Solve the CC equation for the excited state (detailed balance)
 - Width fluctuation correction when off-diagonal elements exist
 - Moldauer
 - Engelbrecht-Weidenmüller transformation
 - Kawai-Kerman-McVoy (KKM)
 - Nishioka-Weidenmüller-Yoshida, GOE for coupled-channels
- I will report :
 - Coupled-Channels Hauser-Feshbach (CCHF) method
 - Apply to calculate neutron capture cross sections for deformed nuclei (no fissile)
 - Super-elastic calculation

Detailed Balance for Compound Reaction

Neutron Emission Probabilities \propto Transmission

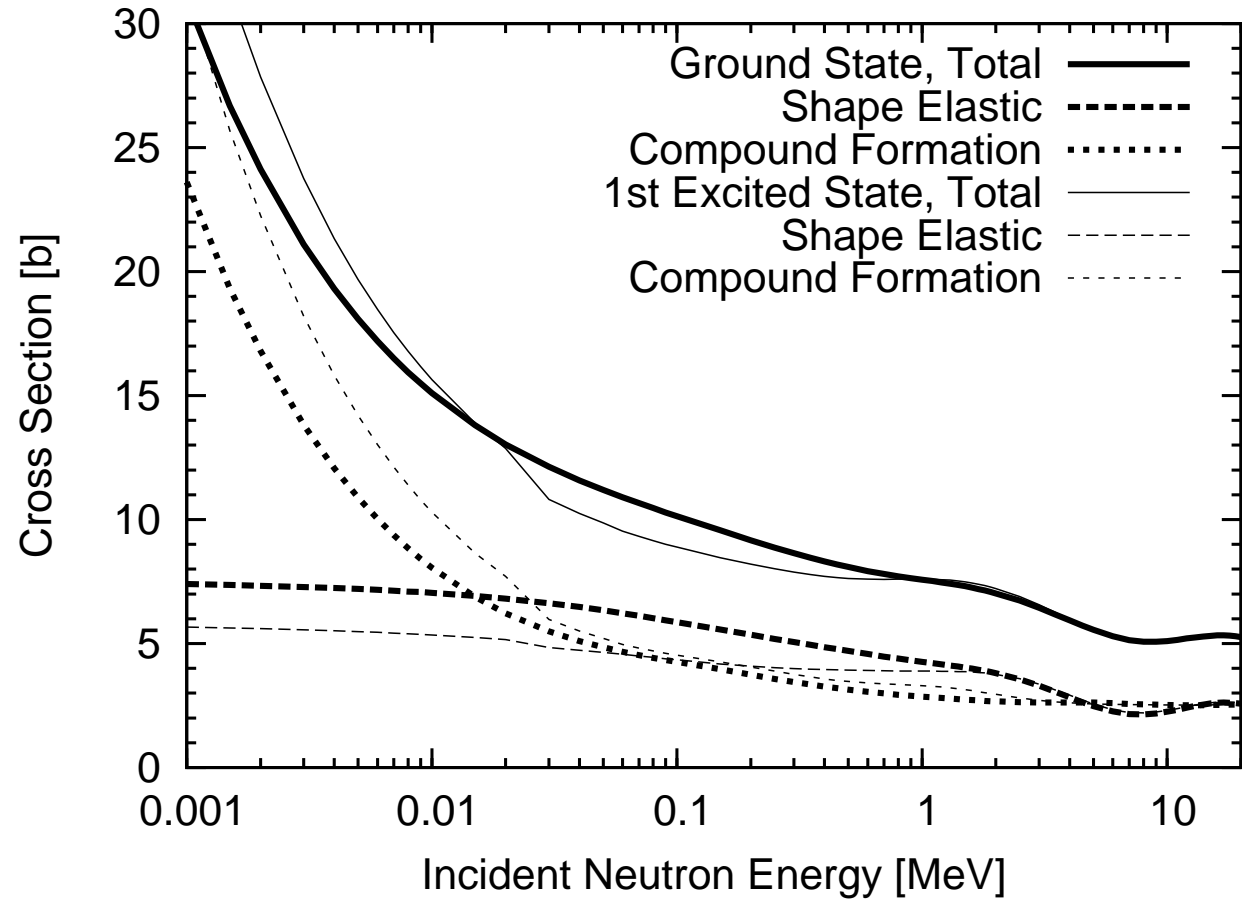
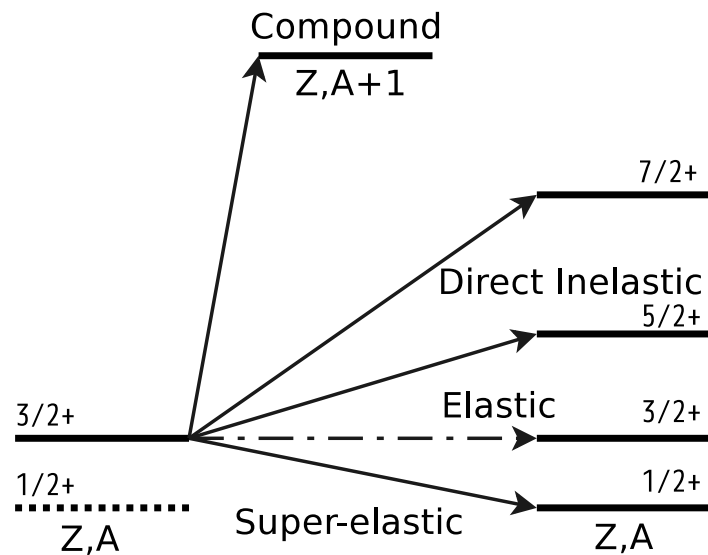


- The same transmission coefficients are used for both entrance and exit channels.
- Sometimes exit channels are corrected by a factor of $1 + \sigma_D/\sigma_R$.
- Solve the Coupled-Channels equations for the excited state, which couples to the negative energy states (super-elastic).

Direct Cross Sections

Coupled-Channels Calculations for the Excited States

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

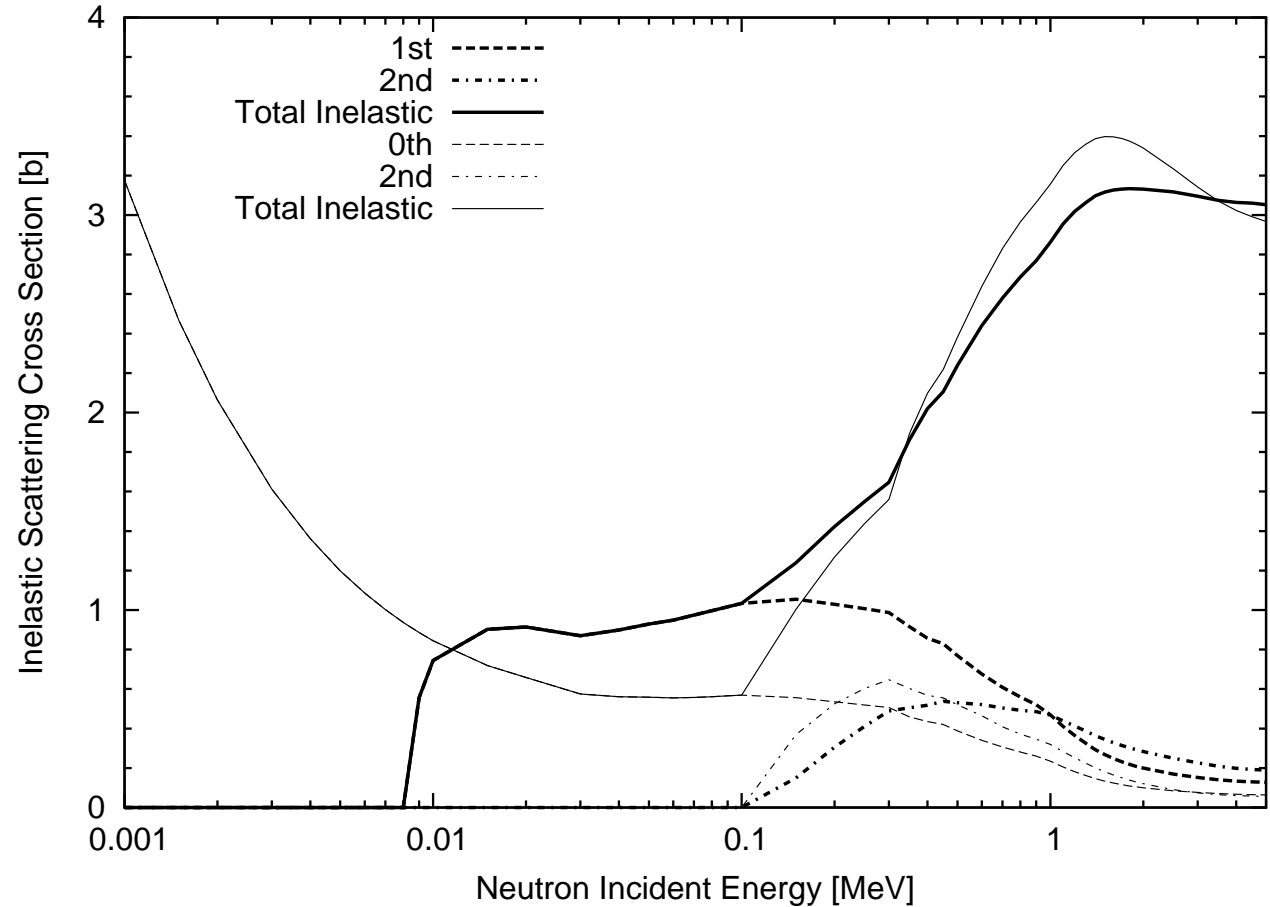
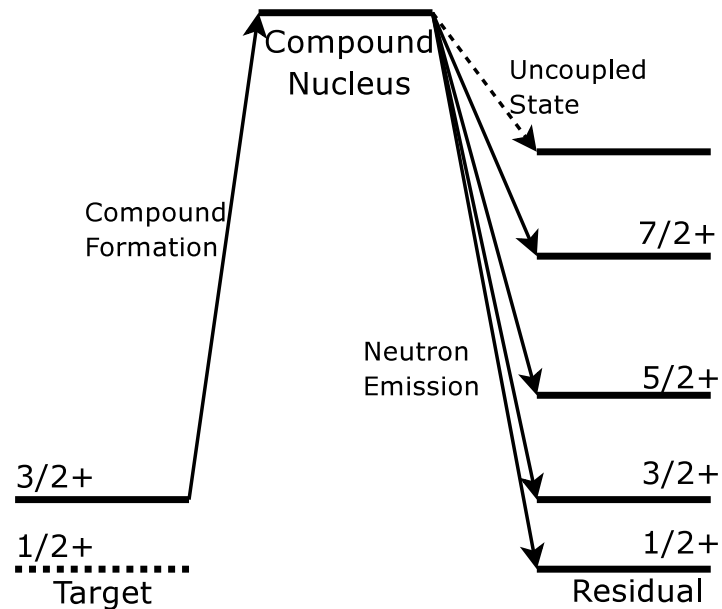


Preliminary

Inelastic Scattering Cross Sections

Hauser-Feshbach Calculations for the Excited States

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



Preliminary