

Evaluated Nuclear Data

background and applications

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Nuclear Engineering Research Seminar, October 13th, 2020

- ▶ Evaluation Methodology

Talking Points

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- ▶ Neutron Data for Actinides

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- ▶ Neutron Data for Other Materials

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- ▶ **Evaluated Nuclear Data Libraries**

Neutron Evaluation Background

- ▶ Large energy spectrum: 10^{-5} to 2.0×10^7 eV

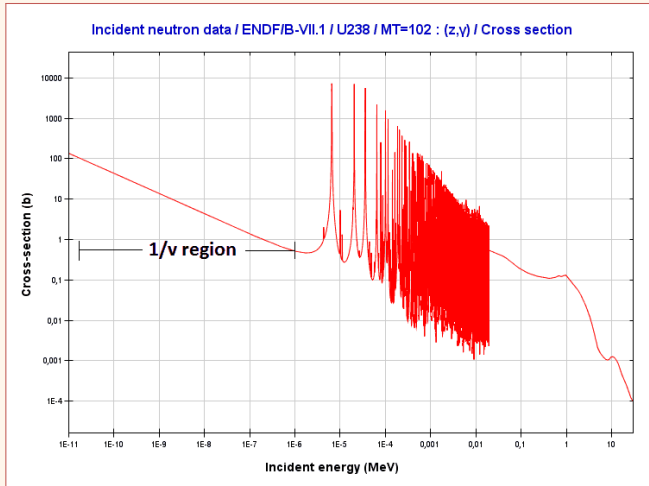
Neutron Evaluation Background

- ▶ Large energy spectrum: 10^{-5} to 2.0×10^7 eV
- ▶ About 400 atomic nuclei, $A = 1 - 250$

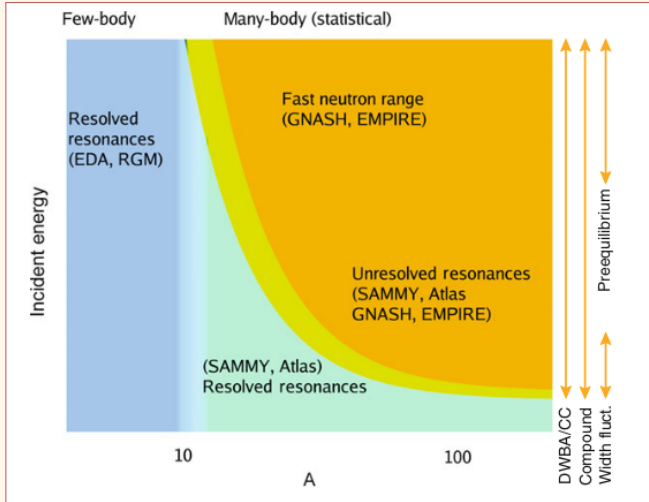
Neutron Evaluation Background

- ▶ Large energy spectrum: 10^{-5} to 2.0×10^7 eV
- ▶ About 400 atomic nuclei, $A = 1 - 250$
- ▶ Measured data + physics based models

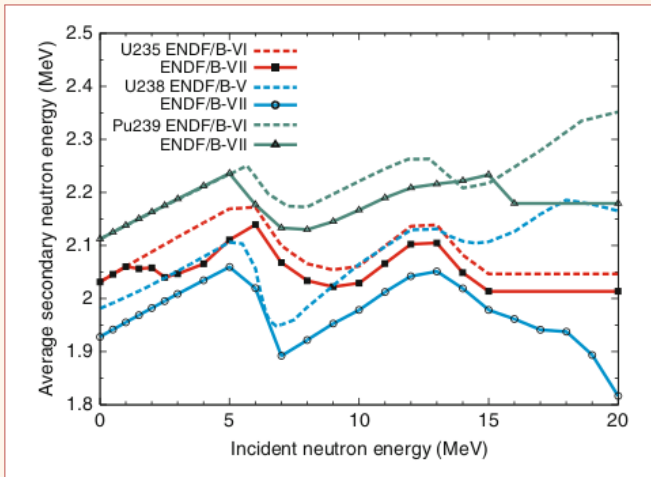
Cross Section Plot



Evaluation Techniques



Fission Spectrum



Neutron Data for Actinides

► U^{235} , U^{238} , Pu^{239}

Neutron Data for Actinides

- ▶ U^{235} , U^{238} , Pu^{239}
- ▶ Np, Am, Cm, other U and Pu

Neutron Data for Actinides

- ▶ U^{235} , U^{238} , Pu^{239}
- ▶ Np, Am, Cm, other U and Pu
- ▶ **thermal constants**

Neutron Data for Actinides

- ▶ U^{235} , U^{238} , Pu^{239}
- ▶ Np, Am, Cm, other U and Pu
- ▶ thermal constants
- ▶ Delayed Neutrons

Neutron Data for Other Materials

- ▶ Light nuclei

Neutron Data for Other Materials

- ▶ Light nuclei
- ▶ Structural Materials

Neutron Data for Other Materials

- ▶ Light nuclei
- ▶ Structural Materials
- ▶ Fission Products

Other Data of Interest

- ▶ Fission Yields

Other Data of Interest

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- ▶ Thermal Neutron Scattering

Other Data of Interest

- ▶ Fission Yields
- ▶ Thermal Neutron Scattering
- ▶ Decay Data

- ▶ General Purpose Libraries
 - ▶ ENDF
 - ▶ JEFF
 - ▶ JENDL
 - ▶ CENDL

- ▶ General Purpose Libraries
 - ▶ ENDF
 - ▶ JEFF
 - ▶ JENDL
 - ▶ CENDL
- ▶ Thermal Neutron Scattering
 - ▶ International Reactor Dosimetry File, IRDF
 - ▶ Fusion Evaluated Nuclear Data Library, FENDL
 - ▶ European Activation File, EAF

Thanks!
Questions?