Analysis of Fission Neutron Spectra of ^{235}U and ^{239}Pu

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Introduction

- Nuclear data for nuclear applications
- Los Alamos (Madland-Nix) model
- Sparse data of ^{235}U and ^{239}Pu fission neutron spectra
- Comprehensive measurements using white neutrons at WNR/LANSCE

Experiments

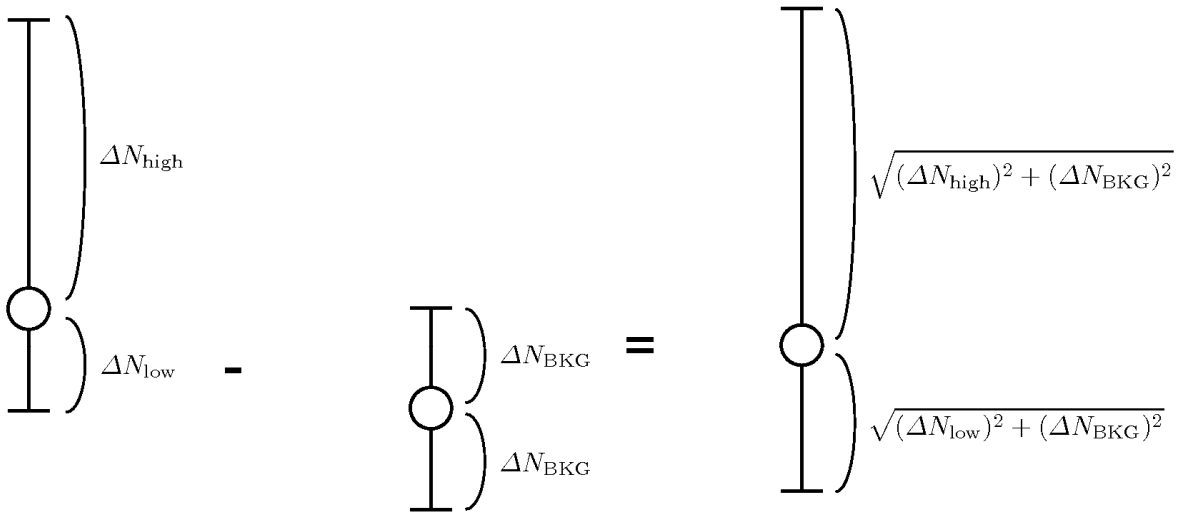
- FIGARO
- CEA fission chamber
  - ^{235}U 100 mg
  - ^{239}Pu 90 mg
- Methods
  - Double time-of-flight technique
  - Pulse-shape discrimination
- Fake-background measurement
- Calibration

Analysis

- Madland-Nix model calculation
  - Total kinetic energy (tke) parameter adjustment
- Average energy
  - Experimental results
  - ENDF-VII evaluated data
  - Madland-Nix model calulations

Errors

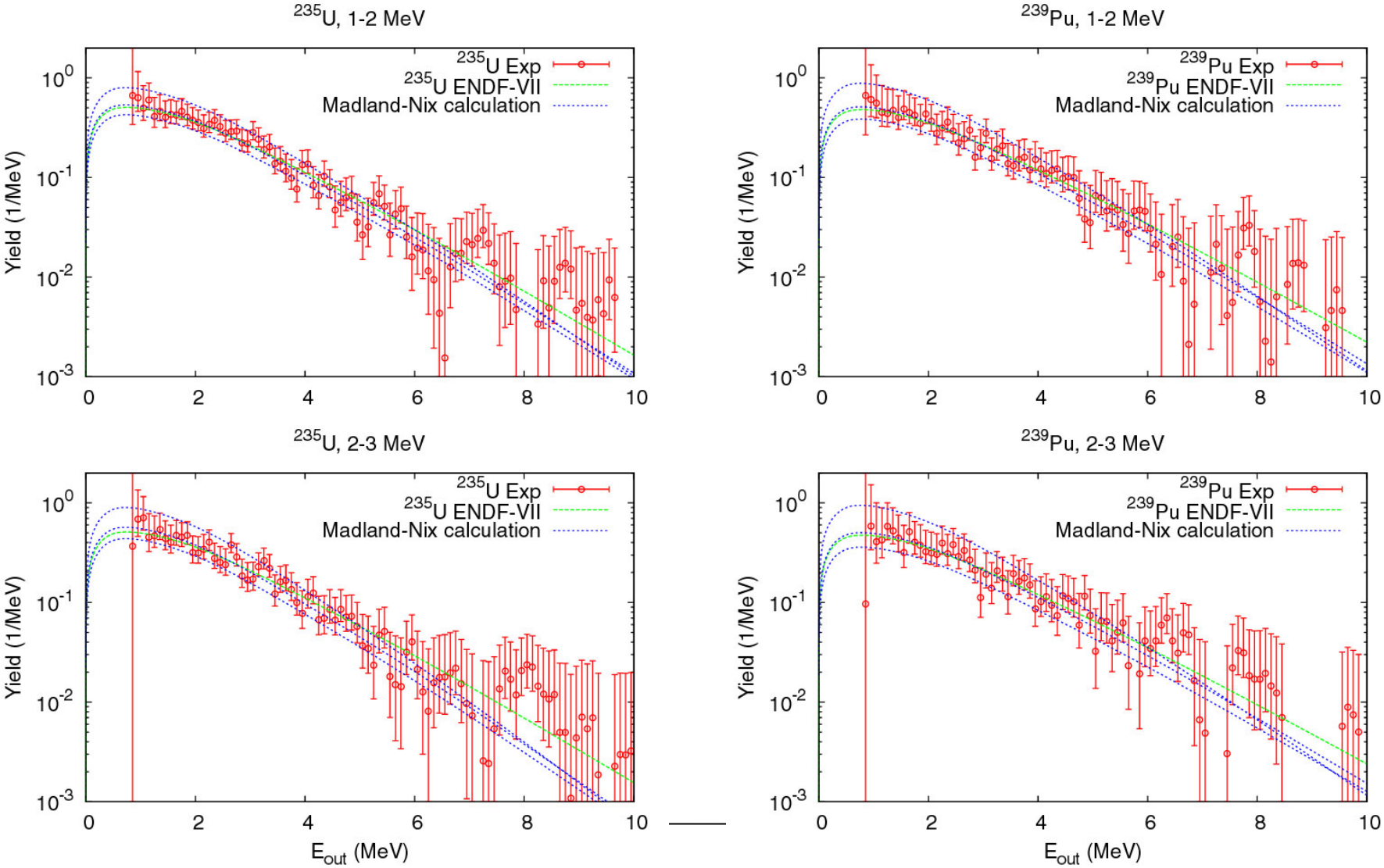
- Poisson statistic for fore-ground
  - Poor statistic
- Gaussian statistic for fake-background
- Assume the error-propagation



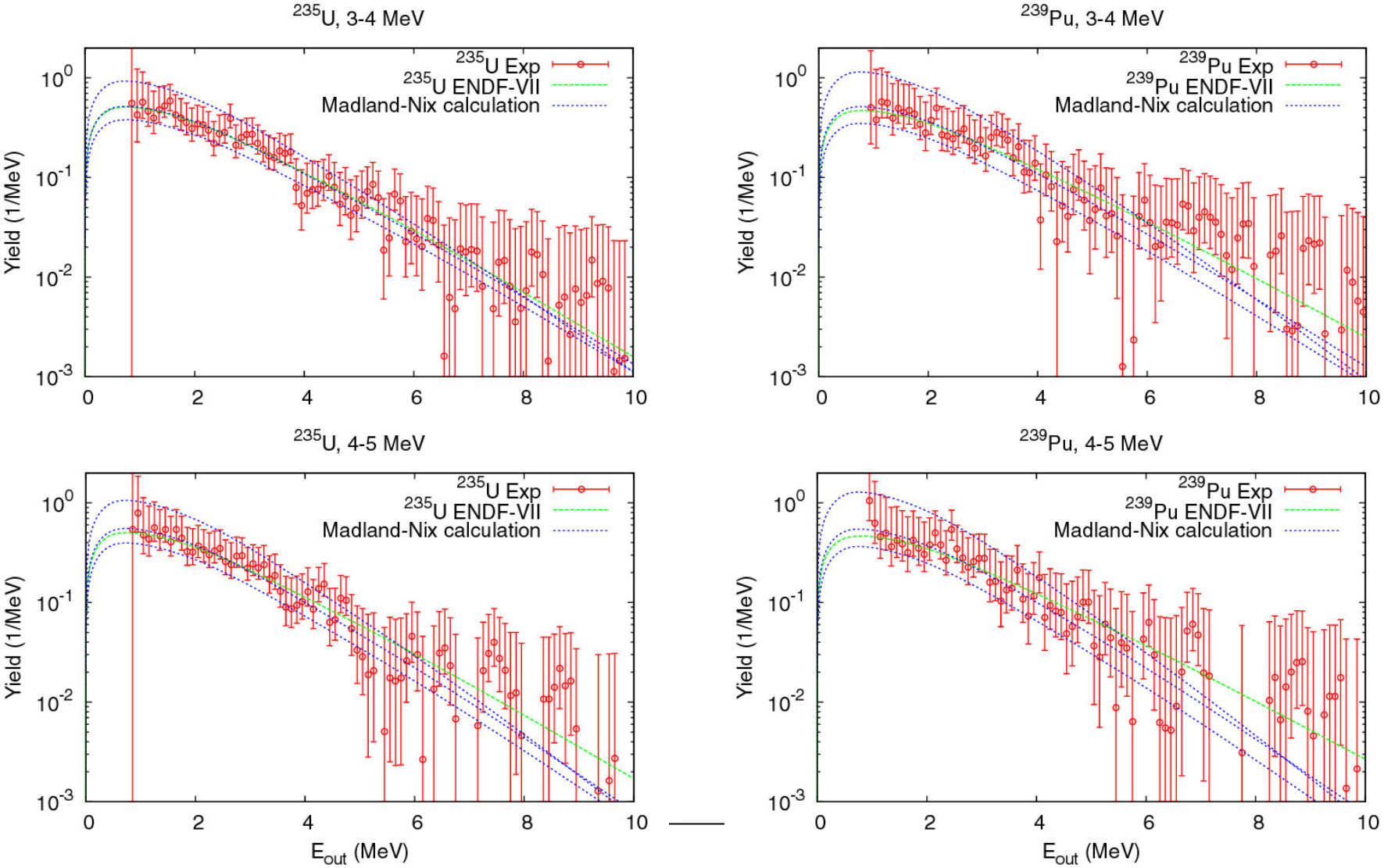
Foreground
with Asymmetric errors
(Poisson)

Background
with Symmetric errors
(Gaussian)

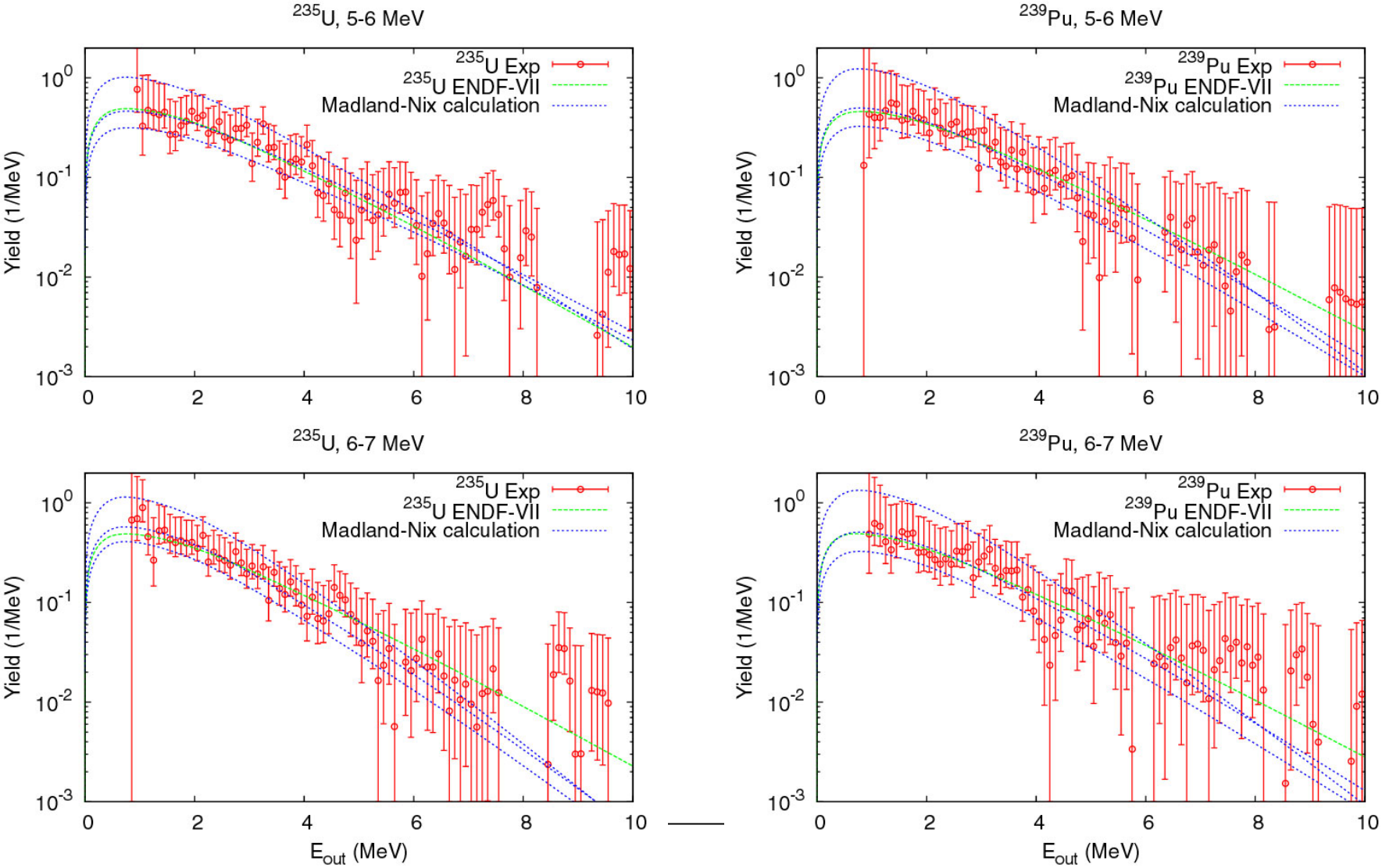
Results, Fission neutron spectra, 1-2 & 2-3 MeV



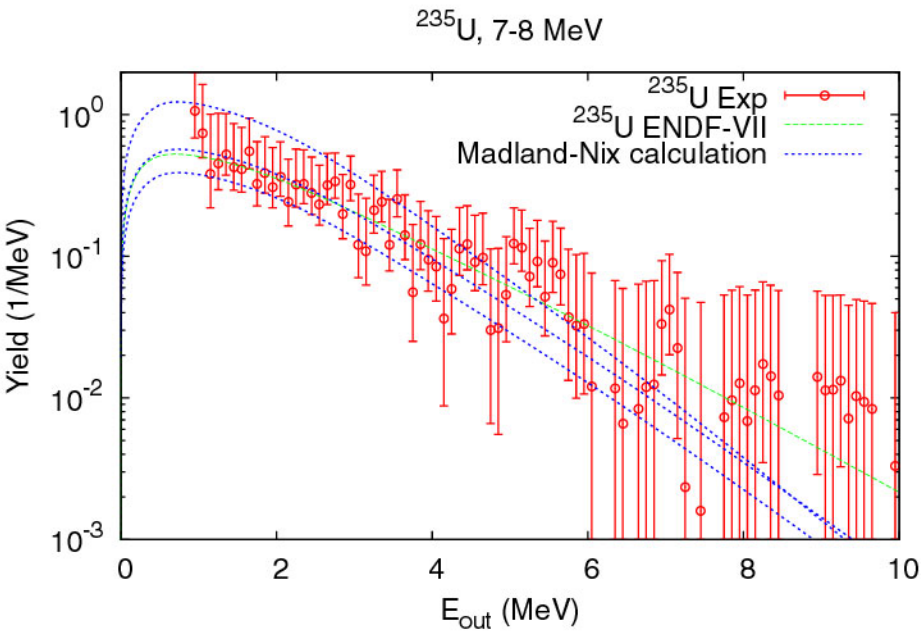
Results, Fission neutron spectra, 3-4 & 4-5 MeV

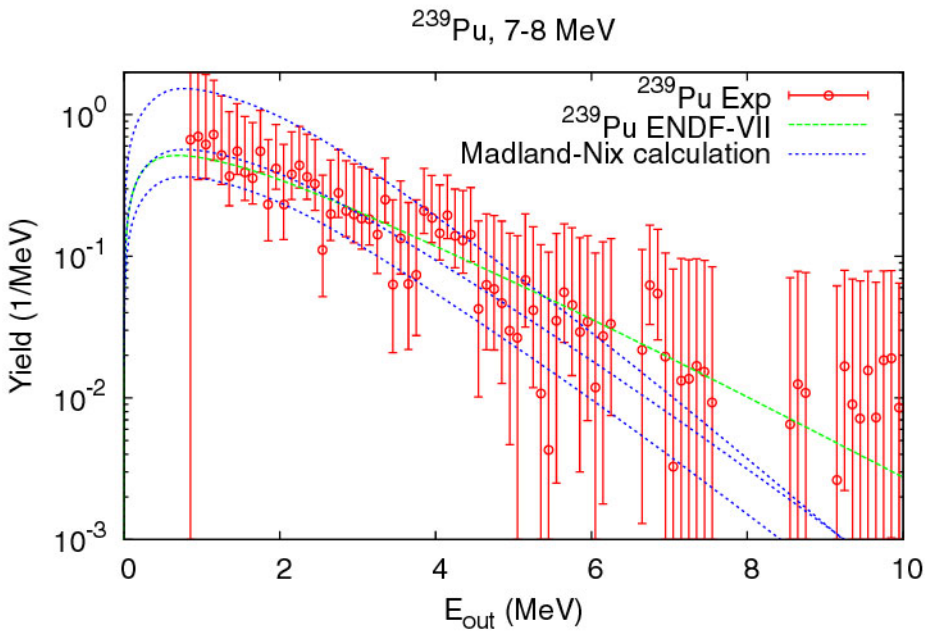


Results, Fission neutron spectra, 5-6 & 6-7 MeV

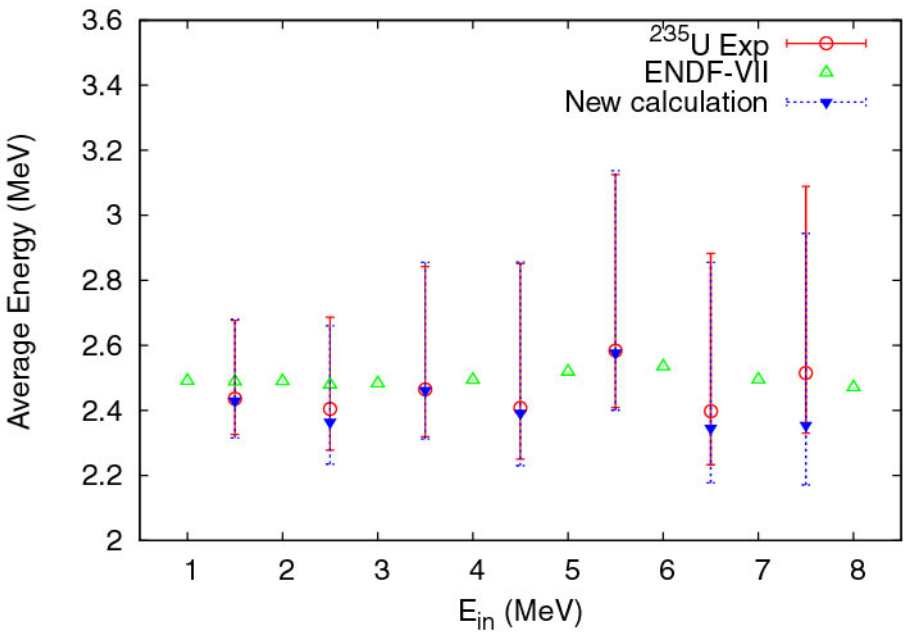


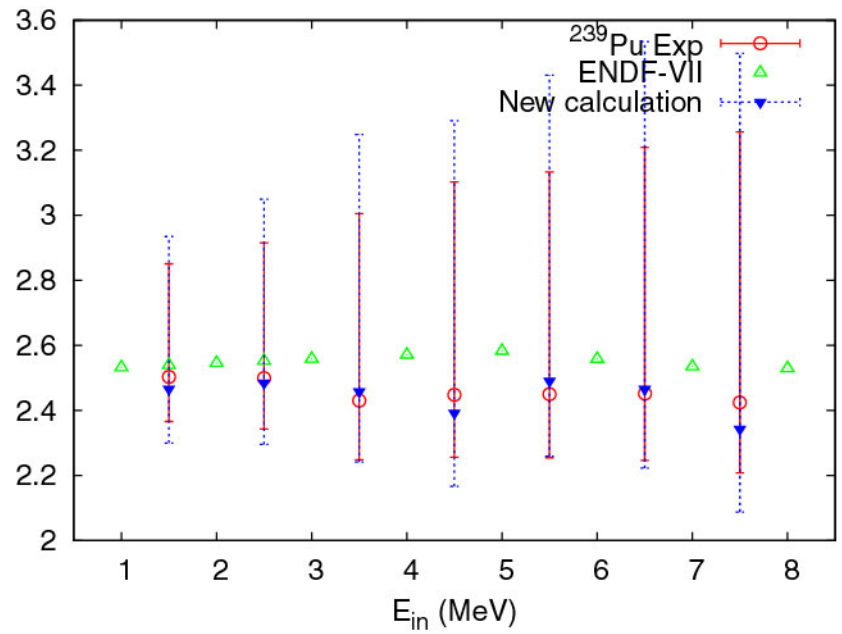
Results, Fission neutron spectra, 7-8 MeV





Results, Average energy





Conclusion

- Measured the fission neutron spectra of 235U and 239Pu for 1-2, 2-3, ..., 7-8 MeV inc
- Calculate average energies of 235U and 239Pu for the energy range 1-8 MeV inc
  - Experimental results
  - ENDF-VII evaluated data
  - Madland-Nix model calculations