

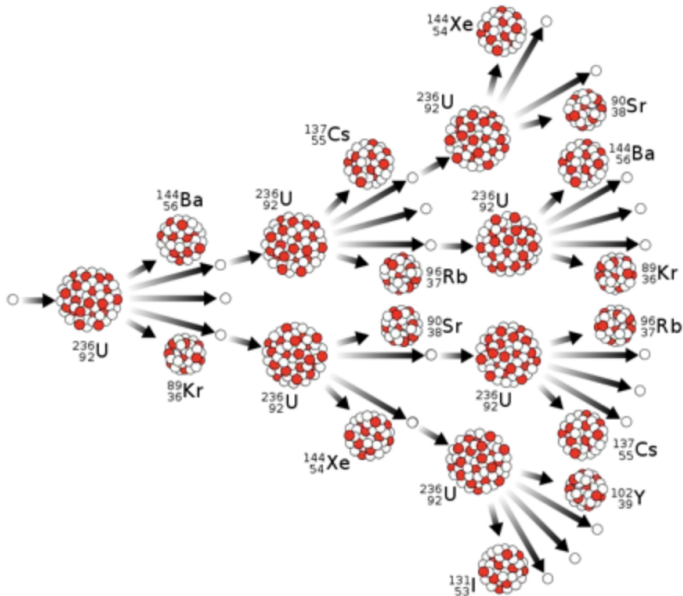


Fission Neutron Spectrum Status and Next Steps

WANDA 2026: Next Gen. Fission Nuclear Data

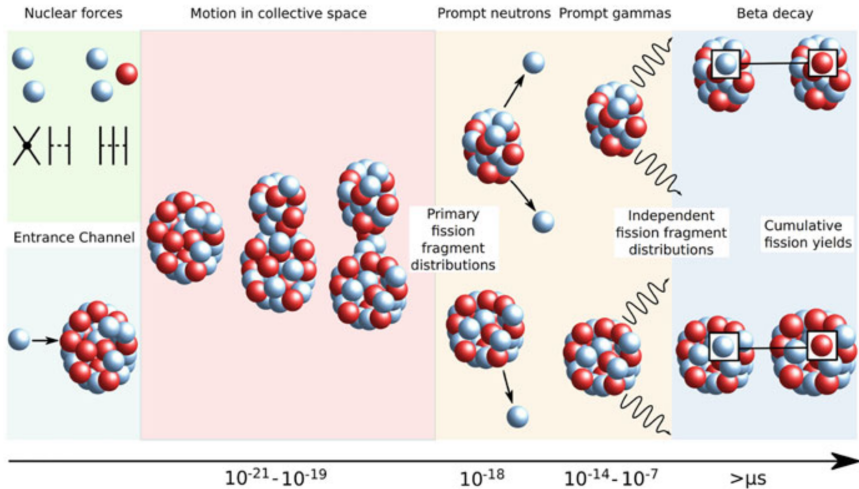
Keegan J. Kelly

Fission $n-\gamma$ Emission is Central to Applications

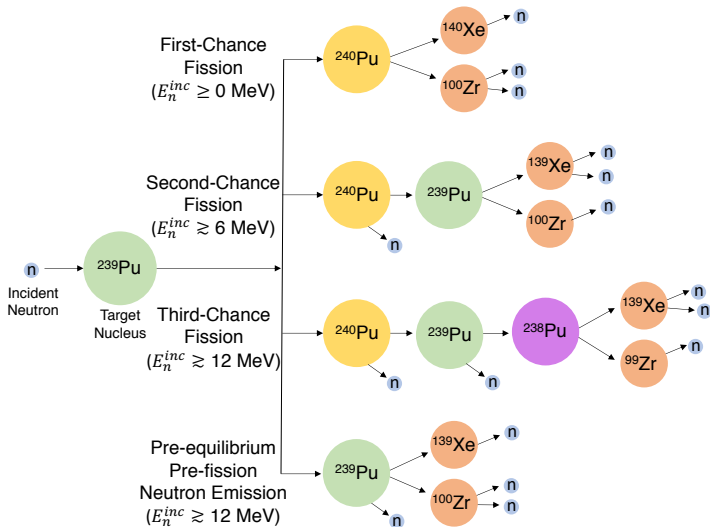


Timescale of Neutron and γ -Ray Emission

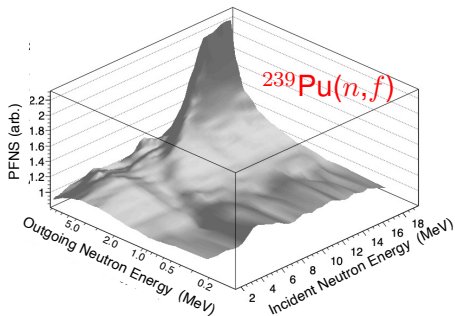
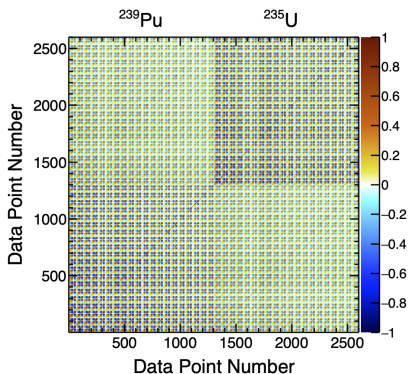
Fig: Schunk & Regnier (2022) Theory of Nuclear Fission



Varieties of Fission, n - γ Energy and Multiplicity

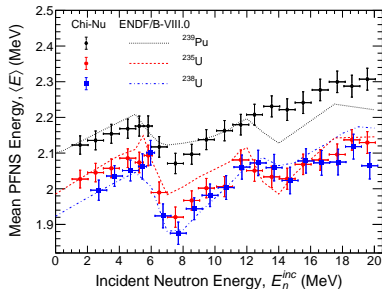


NNSA/CEA White-source PFNS Data Constrain E_n^{inc} & Target-Correlated PFNS Shapes

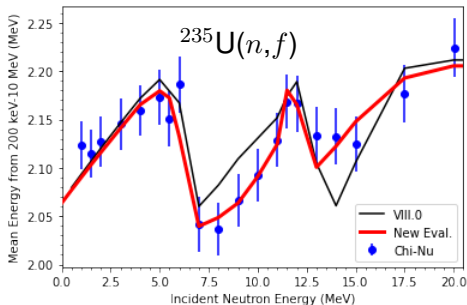
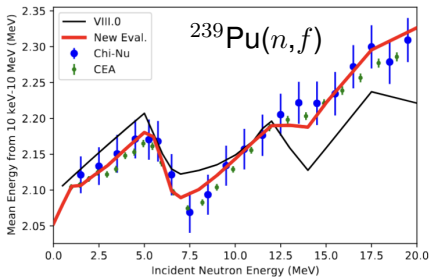


Current Physics Publication List:

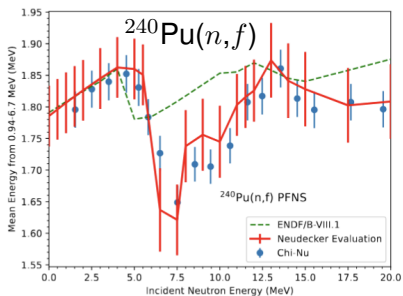
- NNSA ^{239}Pu PRL: PHYSICAL REVIEW LETTERS **122**, 072503 (2019)
- CEA ^{239}Pu PRC: PHYSICAL REVIEW C **102**, 034615 (2020)
- NNSA ^{239}Pu PRC: PHYSICAL REVIEW C **101**, 044614 (2020)
- NNSA ^{235}U PRC: PHYSICAL REVIEW C **105**, 044615 (2022)
- NNSA ^{238}U PRC: PHYSICAL REVIEW C **108**, 024603 (2023)
- NNSA ^{240}Pu PRC: PHYSICAL REVIEW C **109**, 064611 (2024)
- CEA ^{235}U PRC: PHYSICAL REVIEW C **111**, 044611 (2025)
- NNSA/CEA ^{239}Pu NDS: Nuclear Data Sheets **173** (2021) 42–53
- CEA ^{239}Pu $\bar{\nu}$ PLB: Physics Letters B **835** (2022) 137513



239,240Pu, 235,238U Evals. Complete or In Prog.; Generating Application Impacts



- Substantial changes have been made to evaluations, some in ENDF/B-VIII.1
- ^{238}U and ^{240}Pu updates will be included in future evaluations



Non-exhaustive List of Fission n ND Needs

- $^{233}\text{U}(n,f)$ PFNS
 - Planned under NCSP in FY26
- $^{252}\text{Cf}(sf)$ PFNS above 15 MeV
 - Need identified during AIACHNE project
 - Neudecker *et al.* EPJ-N (2025) **11** 70
- ^{237}Np PFNS evaluation updates
 - Modern measurements needed
- $^{238}\text{Pu}(n,f)$ data, broadly
 - Massive α emission is problematic
- Distributions, correlations and exclusive data to constrain fission models
 - E and ϑ n - n , f - n , and f - γ measurements
 - Lovell, *et al.* PRC (2020) **102** 024621

