Evaluation of prompt fission neutron spectra of actinides

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I. INTRODUCTION

Status before the CRP (R. Capote), physical overview of the problem (KHS)

II. EXPERIMENTS

- U5 thermal: Kornilov, Pronyaev - U5 other energies: Kornilov, Pronyaev - Cf252 sf : Pronyaev - Pu239, all energies: Neudecker + Chatillon - U233: Pronyaev, Vorobyev - U238: Oberstedt, Saxena - Th232: Saxena, Oberstedt

A. List of all experiments

a. U235: thermal (6 data sets) b. Cf252sf: c. U235: all other energies d. Pu239: thermal, up to 3.5 MeV + Chatillon Einc=1–60 MeV e. U233: thermal, 0.5 MeV f. U238: all energies g. Th232: all energies h. Minor Actinides: EXFOR data list (Otsuka)

B. Uncertainty analysis of existing data for important actinides

C. Guideline on uncertainty quantification

D. Overview of ongoing or planned experiments

Chi-Nu (LANSCE), U238 (Bruyeres-le-Chatel;BARC,India;IRMM?), Cf252sf (Eout¿8 MeV; Ohio U.); Cf252sf (IRMM, Chi-Nu?)

E. Overview of ongoing or planned experiments

F. Recommendations for future experiments, future detectors, etc.

Kornilov

G. Web repository of experimental data sets with uncertainty quantification

Capote/Otsuka/Trkov

III. MODELLING

Capote, Kornilov, Ohsawa, Schmidt, Serot, Shu, talou, Tudora, Vogt

To be covered in each model section: physics assumptions, input data & model parameters, output data, sensitivity of calculated results to input data and model parameters. Calculations of selected spectra (Cf252sf, U235th, Pu239th).

A. Los Alamos model

Ohsawa/Talou

B. PbP Los Alamos model

Tudora

C. Empirical parameterization

Kornilov/Capote - Two-Watt

D. Semi-empirical parameterization

Shu

IV. EVALUATIONS (SPECTRUM + COVARIANCES)

A. Evaluation methodologies

B. Description of new evaluations

V. DATA TESTING

A. Thermal criticality benchmarks

Trkov, Capote + those calculating the optional thermal benchmarks

It is recommended to add HEU-SOL-THERM-009 serie (A. Trkov) and PU-SOL-THERM 001 serie (SG34) to the testing. These are large leakage thermal benchmarks highly sensitive to the thermal U235 and Pu239 spectra.

B. Fast criticality benchmarks

Kodeli, Morillon, Manturov, Serot

C. $\beta_{\rm eff}$ benchmarks

Kodeli

D. Reaction rates in reference neutron fields

Capote and Trkov

E. NUEX experiment

Talou

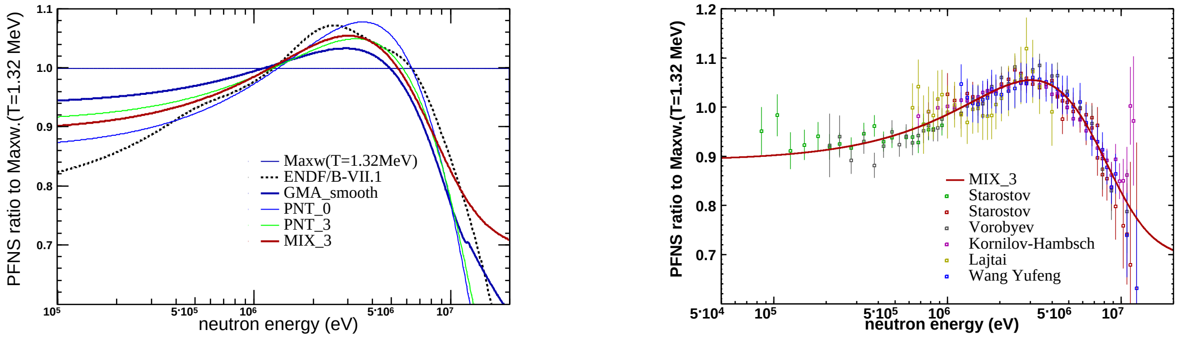

FIG. 1: Fitted spectra (left); and comparison of the fitted basis function with renormalised differential data (i.e. shape data) (right) displayed as ratios to a Maxwellian with temperature 1.32 MeV.

VI. SUMMARY AND CONCLUSIONS

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[1] EXchange FORmat database (EXFOR) is maintained by the Network of Nuclear Reaction Data Centers (see *http://www-nds.iaea.org/nrdc/*). Data available online (e.g. at *http://www-nds.iaea.org/exfor/*).

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