

Proposal for a Subgroup on Covariance Data in Fast Neutron Region

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Subgroup on Covariances in Fast Neutron Region

Objective:

- Develop methodology and tools for producing covariance data in the fast neutron region and consider correlation between fast, UR and RR regions.

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Specific goals:

- Develop covariance generation capabilities in McGNASH and EMPIRE using Monte Carlo sensitivity method (TALYS has it already)
- Develop covariance generation capabilities using Kalman method coupled to McGNASH, EMPIRE and TALYS.
- Compare results of both methods and validate (test) the methodology by comparison with experimental covariance data
- Address correlations between RR, UR and fast neutron regions
- Produce covariance data for a few selected materials

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Membership:

- Coordinator:
- Monitor: A. Koning, JEFF Project
 - JEFF – A. Koning, E. Bauge
 - ENDF – M. Herman and P. Oblozinsky (BNL), T. Kawano and P. Talou (LANL), D. Smith (ANL), R. Capote (IAEA)
 - JENDL – T. Nakagawa (JAERI)
 - BROND - ...

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Background:

- *Monte Carlo sensitivity method (proposed by D. Smith)*
 - *Implemented in TALYS*
 - *Relatively easy but computationally intensive*
 - *Provides full covariances for all observables*
 - *To be solved: correlation of model parameters*
- *Kalman method*
 - *Implemented by Kawano and used in JENDL and at Los Alamos*
 - *Uses Bayesian analysis*
 - *Accounts for experimental data*
 - *Computationally efficient*
 - *Tends to produce low uncertainties (?)*

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- *Both methods can provide full covariances between: reactions, energies, input parameters (actually more than needed)*
- *Kalman can be used to fit experimental data (Monte Carlo sensitivity also ?)*

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- *Duration*
 - *2005 – 2008*
- *Deliverables*
 - *Methodology*
 - *Covariances for selected materials*
 - *Report*