

# Proposal for a Subgroup on Covariance Data in Fast Neutron Region

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WPEC Meeting, April 8-9, 2005

# 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.

# Subgroup on Covariances in Fast Neutron Region

## 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

# Subgroup on Covariances in Fast Neutron Region

## 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 (?)*

# Subgroup on Covariances in Fast Neutron Region

- *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 ?)*

# Subgroup on Covariances in Fast Neutron Region

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