

Collaboration topics for WPEC subgroups 44 & 46

Vladimir Sobes (ORNL)

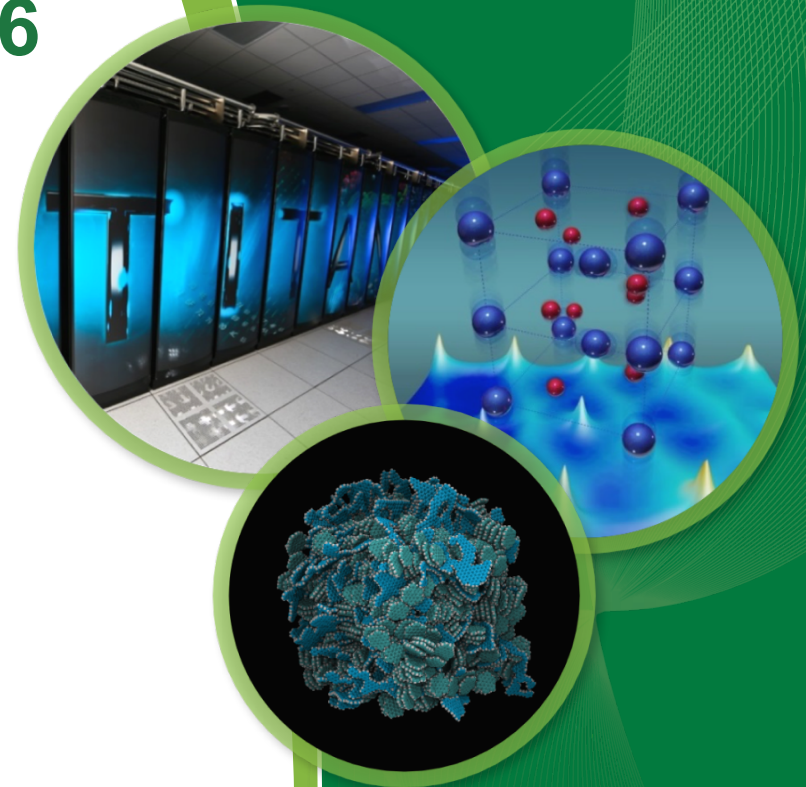
Cyrille de Saint Jean (CEA)

NEA Nuclear Data Week

NEA Headquarters

Boulogne-Billancourt, France

20–24 November 2017



Deliverables

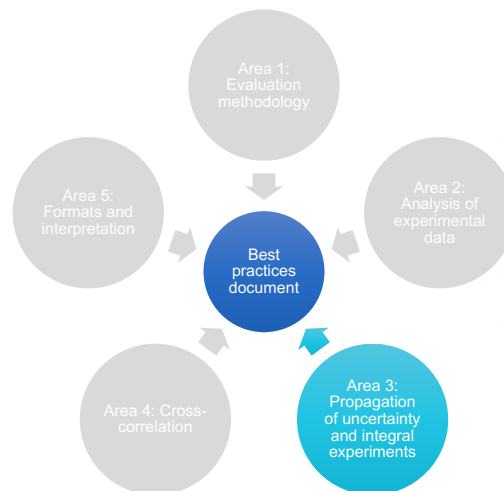
- **2018-2019:** Review of discrepant covariance data across major nuclear data projects and establishment of a high priority list for nuclear data covariance evaluation
- **2019-2020:** Draft version of Best Practices Document for General Purpose Nuclear Data Library covariance evaluations
- **2020-2021:** Final version of Best Practices Document for General Purpose Nuclear Data Library covariance evaluations, complete with examples

5 subject areas for SG44



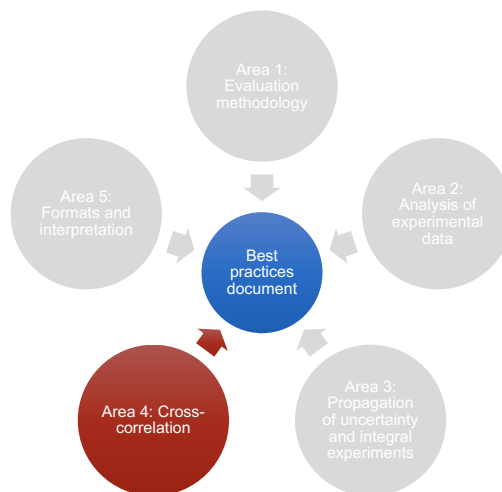
Area 3: Propagation of uncertainty and integral experiments—*Collaboration with SG46*

1. Use of integral experiments in evaluations, documentation
2. Other probability distributions for nuclear data uncertainty: joint effort with Area 2 and Area 4
 1. Document
 2. Format
3. Testing of covariance data: joint effort with Area 5



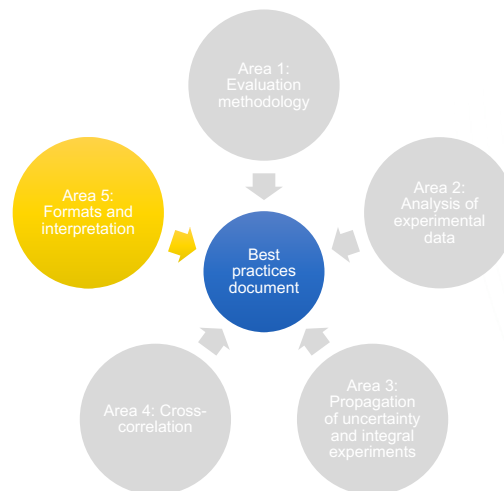
Area 4: Cross-correlation

1. Reactions (unitarity): joint effort with Area 5
2. Cross-isotope and when to neglect
3. Other types of data, distributions
4. Space for storing evaluation/integral experiments correlations



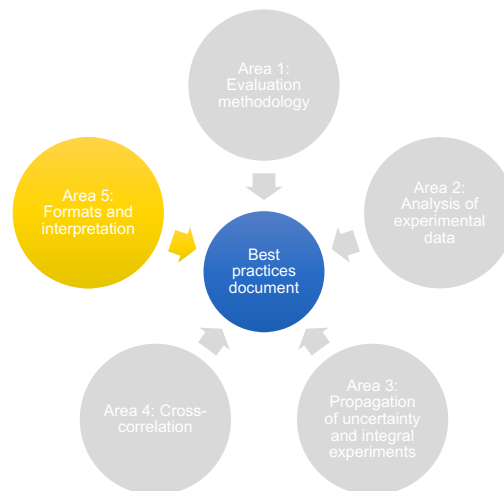
Area 5: Formats and interpretation

1. Documentation of covariance evaluation technique
 1. Clear interpretation by evaluator
 2. Model parameters and code
 3. Reporting known unknowns vs estimating unknown unknowns
 4. Clear interpretation by user
2. Verification: positive definite, robust, stable to numerical errors. How to deal with negative eigenvalues?
3. Multigroup cross section covariance group and weighting assumptions



Area 5: Processing codes wish list— *Collaboration with SG43*

1. Cross-correlations
2. Prompt fission neutron spectra (PFNS) correlations to cross section
3. Covariances of secondary distributions (e.g., inelastic)
4. Higher order angular distribution
5. $S(\alpha, \beta)$ format
6. Random files



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Backup Slides

Vladimir Sobes (ORNL)

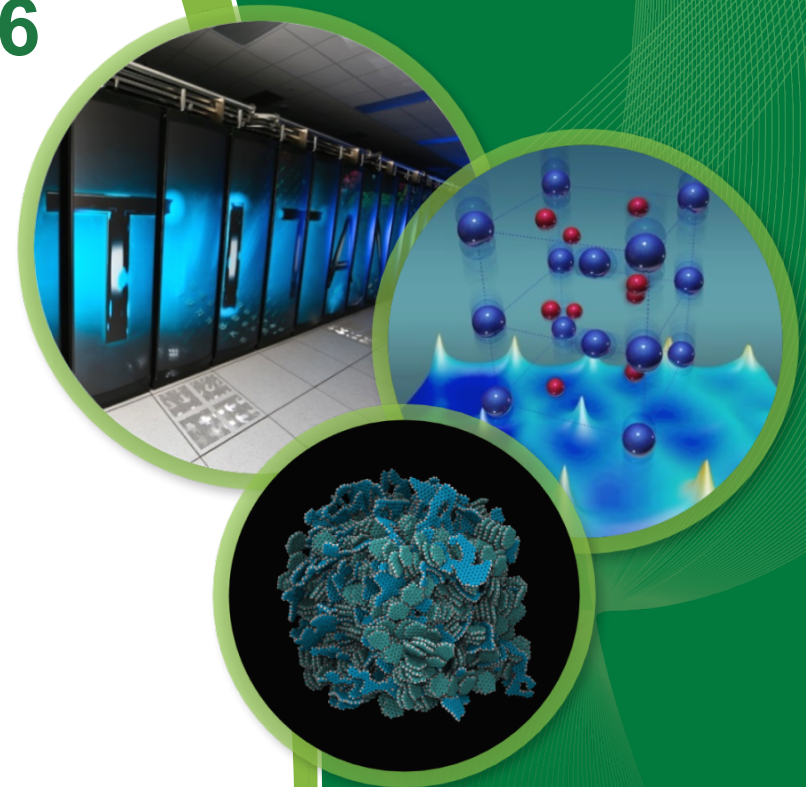
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Working Party on International Nuclear Data Evaluation Cooperation (WPEC)

#	Subgroup Name	Coordinators
39	Methods and approaches to provide feedback from nuclear and covariance data adjustment for improvement of nuclear data files	G. Palmiotti M. Salvatores
40	Collaborative International Evaluated Library Organization (CIELO) Pilot Project	M. Chadwick
41	Improving nuclear data accuracy of Am-241 and Np-237 capture cross-sections	H. Harada
42	Thermal scattering kernel $S(\alpha,\beta)$: measurement, evaluation and application	G. Noguere
43	Code infrastructure to support a modern General Nuclear Database (GND) structure	F. Malvagi
44	Investigation of covariance data in general purpose nuclear data libraries	V. Sobes C. de Saint Jean
45	Validation of Nuclear Data Libraries (VaNDaL) Project	M. White D. Bernard
46	Efficient and effective use of integral experiments for nuclear data validation	M. Salvatores G. Palmiotti

Subgroup participants (1/2)

- **Subgroup coordinators**

- Vladimir Sobes, ORNL, USA, (ENDF)
- Cyrille de Saint Jean, CEA, France, (JEFF)

- **ENDF**

- **Oak Ridge National Laboratory (ORNL):** Arbanas, Guber, Rearden, Sobes, Wiarda, Williams
- **Los Alamos National Laboratory (LANL):** Chadwick, Haeck, Neudecker, Talou, White
- **Lawrence Livermore National Laboratory (LLNL) :** Beck, Jugenson, Mattoon
- **Brookhaven National Laboratory (BNL):** Brown, Herman
- **National Nuclear Laboratory (NNL):** Barry, Holmes
- **Rensselaer Polytechnic Institute (RPI):** Danon
- **Spectra Tech Inc.:** Dunn
- **INL:** Palmiotti
- **CNL:** Roubtsov
- **ANL (retired):** Smith

Subgroup participants (2/2)

- **JEFF**

- **CEA:** Archier, Bauge, Noguere, de Saint Jean, Tamagno
- **IRSN:** Ichou, Ivanov, Leal
- **PSI:** Hursin, Rochman
- **NEA:** Ivanova, Michel-Sendis
- **CNRS:** Kessedjian
- **KAERI:** Kim
- **JSI:** Kodeli
- **TU Wien:** Leeb
- **NNL:** Mills
- **CIEMAT:** Romojaro
- **Consultant:** Salvatores
- **JRC:** Schillebeeckx
- **UPM:** Cabellos

- **JENDL:** Iwamoto, Yokoyama, Chiba

- **BROND:** Ignatyuk, Rozhikhin, Koscheev

- **CENDL:** X. Ruirui, Z. Ge

- **TENDL:** Sjöstrand

- **IAEA-NDS:** Capote, Trkov

Major contributions

1. Establish quality criteria in the nuclear data evaluation community through a best practices document, including:
 - a. Establishing guidance on the quality/fidelity of documentation of new covariance evaluations
 - b. Commenting on the place of integral experiments in general purpose nuclear data libraries
2. Consider new types of data for covariance:
 - a. Secondary distributions, angular distributions, $S(a,b)$, prompt fission neutron spectra, collaboration with SG42
 - b. Correlations, energy, reaction, data type, isotopes
3. Take opportunity to redefine the covariance format working with GNDS
4. Collaborate with SG43 and EG-GNDS

Deliverables

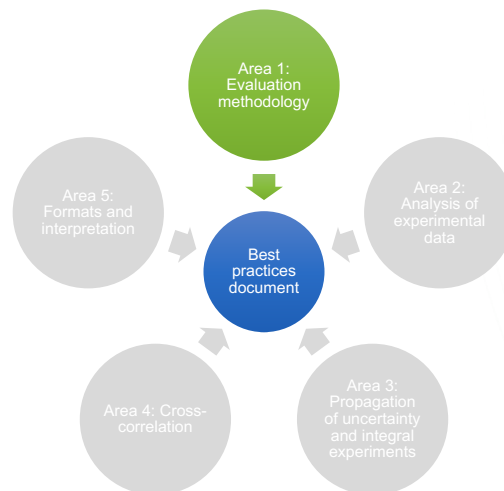
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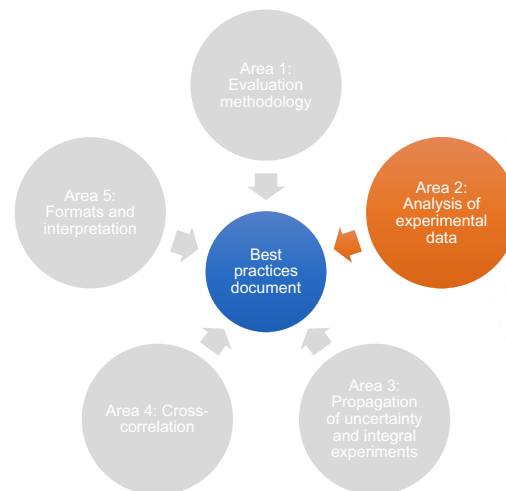
Area 1: Evaluation techniques

1. Model defects: phenomenological models can be poor but with very low evaluated uncertainties
2. Model biases: inference of biases from advanced models
3. Treatment and representation of uncertainties in the unresolved resonance region where self-shielding is important for reactors



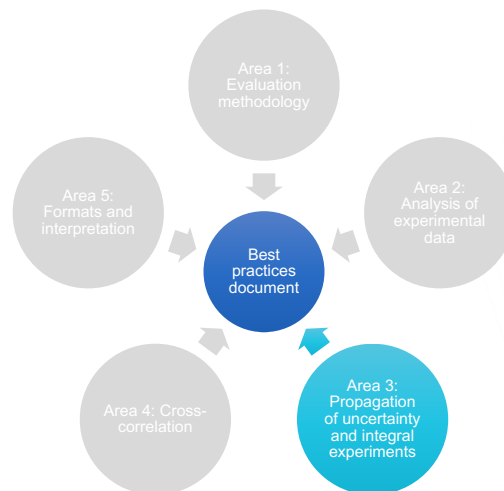
Area 2: Analysis of experimental data

1. Sources of experimental uncertainty
 1. Catalog
 2. Publication requirements (not only numbers)
 3. Recommendations for EXFOR database
 4. Algorithms/methods
2. Commenting on autonomous/automatic methods
3. Commenting on handling of discrepant data sets



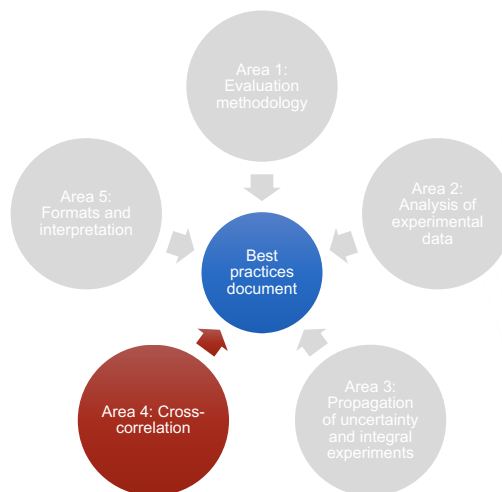
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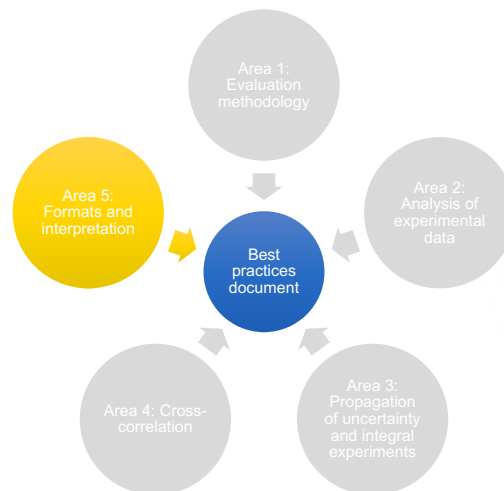
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