

PAUL SCHERRER INSTITUT



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WP.4: Nuclear data evaluation and uncertainties

HORIZON
2020



SANDA kick-off meeting, 9-10 September, 2019, University Foundation club,
Brussels, Belgium



Summary

- Description of activities
- Commitments
- Deliverables
- Milestones, dates
- Institutions, laboratories
- Efforts
- Actions

WP.4: overall goals

1. Continue the development of open-source evaluation tools (reactions, decay, structure)
2. Perform evaluations on important isotopes (link with WP.2)
3. Provide processed data for application
4. Provide sensitivity vectors for feedback analysis
5. Link with WP.5 for recommendations on validation

WP.4: Description of activities

1. Task 4.1: Nuclear reaction code developments and evaluations (coordinator PSI D. Rochman)

–Partners: CEA/DAM/DIF, CEA/DEN, PSI, CNRS/IPHC, UTW, UB, UU, IRSN

–Subtask 4.1.1: TALYS development

Better modelling (microscopic and phenomenological models)

Better link with GEF

Influence of theoretical descriptions on emitted spectra

–Subtask 4.1.2: Nuclear reaction evaluation

Bayesian inference & model defect

In-depth evaluation

Automation & portability

WP.4: Description of activities

2. Task 4.2: Fission yields, structure and decay data evaluation (coordinator IFIN-HH A. Negret)

–Partners: IFIN-HH, CEA/LNHB, CEA/DEN, CNRS/LPSC, Sofia, Atomki, CNRS/Subatech

–Subtask 4.2.1: Fission yield evaluation

Test model assumptions

Using measured $TKE=fct(A,Z)$

Link with GEF and FIFRELIN

–Subtask 4.2.2: Structure and decay data evaluation

Based on ENSDF and RIPL

Based on TAGS

Produce covariance for beta decay data

WP.4: Description of activities

3. Task 4.3: Processing and sensitivity

(coordinator UPM O. Cabellos)

- Partners: CIEMAT, UPM, CNRS/Subatech
- Produce processed files with NJOY/PREPRO
- Produce processed files for SCALE (AMPX) and GEANT4
- Used libraries: JEFF-3.3, ENDF/B-VIII.0 and JENDL-4.0u2

- Review of the tools
- Verifications of the tools, files and covariances

- Applications to calculations (criticality, shielding and SNF)

- Sensitivity and uncertainty propagation

WP.4: Description of activities

4. Task 4.4: Support for Applications (coordinator CIEMAT D. Cano-Ott)

- Partners: UPM, CIEMAT, JSI
- Link with WP.5
- Benchmark recommendations (ICSBEP, SINBAD and SFCOMPO)

5. Task 4.5: High-energy model uncertainties (coordinator CEA/Saclay S. Leray)

- Partners: CEA/Saclay, USC
- Above 20 MeV
- Propagation of uncertainties from high-energy models and parameters

WP.4: Commitments

1. Task 4.1: New TALYS & EMPIRE, reporting, evaluations RRR+fast
(Cr, Mo, other FP, Pu, other AC)
2. Task 4.2: Report on “fission yield analysis with FIFRELIN”, ENSDF evaluations, FY evaluations with TAGS
3. Task 4.3: Report on processing, sensitivity to FY
4. Task 4.4: Recommendation of benchmarks and uncertainty propagation
5. Task 4.5: Report on uncertainties due to high-energy models and their parameters

WP.4: Deliverables

1. D.4.1: Report on code development, methods and new evaluations, [PSI](#)
2. D.4.2: Report on FY and nuclear structure and decay data, [IFIN-HH](#)
3. D.4.3: Report on processing and sensitivity analysis, [UPM](#)
4. D.4.4: Report on applications, recommendations, [CIEMAT](#)
5. D.4.5: Report on possibility to generalize a Bayesian methodology, [CEA/Saclay](#)

WP.4: Milestones, dates

1. M.4.1: Availability of TALYS modules, CEA/DAM/DIF (date ?)
2. M.4.2: Availability of new EMPIRE modules/models, UB (date ?)
3. M.4.3: Availability of evaluated files, CEA/DEN, PSI, IRSN (date ?)

WP.4: Institutions, efforts

Work package number	WP4			Lead beneficiary	PSI		
Work package title							
Participant number							
Short name of participant	CEA	<u>PSI</u>	CNRS	CIEMAT	UU	UTW	UB
Person-months per participant							
EC contribution per participant k€	257.5	99	93.7	70.8	91	52.4	78.4
Participant number							
Short name of participant	UPM	JSI	IFIN-HH	USC	Sofia	Atomki	
Person-months per participant							
EC contribution per participant k€	46	36	20	25	20	20	
Participant number							
Start month	1			End month	48		

WP.4: Actions

Action 1: CEA/DAM/DIF, task 4.1.1, release of TALYS modules.

Action 2: UTW, task 4.1.2, detailed reporting (or journal paper) on the complete evaluation scheme and developed tools.

Action 3: UU, task 4.1.2, release of a code package for treating model defects in the fast energy range.

Action 4: UU, task 4.1.2, release of ENDF-6 evaluations for Cr isotopes.

Action 5: CEA/DEN, task 4.1.2, release of ENDF-6 evaluations for actinides and fission products.

Action 6: PSI, task 4.1.2, release of ENDF-6 evaluations and input files for fission products.

Action 7: CNRS/IPHC, task 4.1.2, provide a new analysis of (n,xng) data in support of full evaluations.

Action 8: UB, task 4.1.2, provide the ENDF-6 evaluations for Pu isotopes.

Action 9: CNRS/LPSC, task 4.2.1, reporting on fission yields analysis with FIFRELIN.

Action 10: CEA/LNHB, task 4.2.2, provide ENSDF evaluations.

Action 11: IFIN-HH, task 4.2.2, provide ENSDF evaluations.

Action 12: Sofia, task 4.2.2, provide ENSDF evaluations.

Action 13: ATOMKI, task 4.2.2, provide ENSDF evaluations.

Action 14: CNRS/Subatech, task 4.2.2, provide a new evaluation with TAGS data.

Action 15: CIEMAT, task 4.3, provide AMPX and GEANT4 processed libraries.

Action 16: UPM, task 4.3, reporting on processing activities.

Action 17: CNRS/Subatech, task 4.3, reporting on sensitivity to fission yields.

Action 18: CIEMAT (with UPM), task 4.4, provide a recommend list of benchmarks.

Action 19: JSI, task 4.4, provide uncertainty analysis for specific benchmarks.

Action 20: CEA/Saclay, task 4.5, reporting on analysis for high energy uncertainties due to models/parameters.

Action 21: USC, task 4.5, reporting on analysis for high energy uncertainties due to models/parameters.