

Status of the nuclear data developments

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Applied side:

- ① TENDL nuclear data libraries (see www.talys.eu/tendl-2013),
- ② Production of new random files (10^4 for $^{235,238}\text{U}$ and ^{239}Pu) for TMC,
- ③ Uncertainties calculations with PANTHER (full core steady state and transient),
- ④ Search for the "*universal*" file (Petten method for JEFF, ENDF/B, JENDL...),
- ⑤ Uncertainty calculations using integral benchmarks (example with Ringhals fuel storage).

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Fundamental side:

- ① Bayesian approach to cross section evaluations (TALYS with Backward-Forward Monte Carlo, Unified Monte Carlo...),
- ② Integration of the GEF code in the TALYS system (for fission yields, neutron spectra, nubar),
- ③ Adjustment of parameters to obtain better cross sections (and uncertainties),
- ④ Merge EXFOR and TALYS: best solution between measurements and calculations,

Collaborations/projects



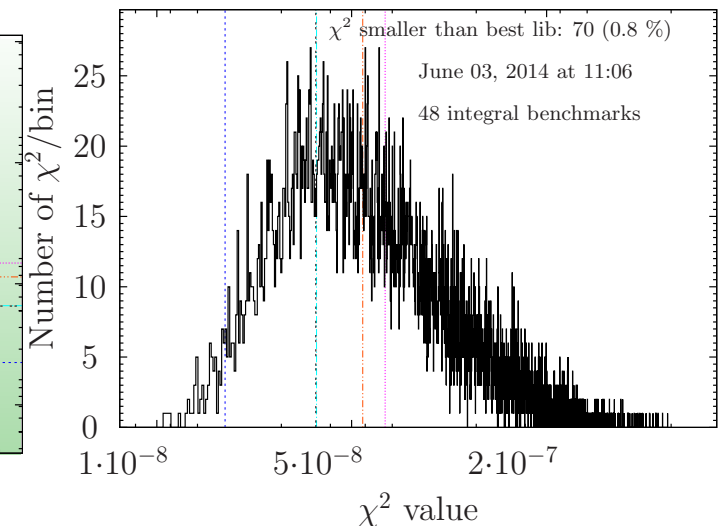
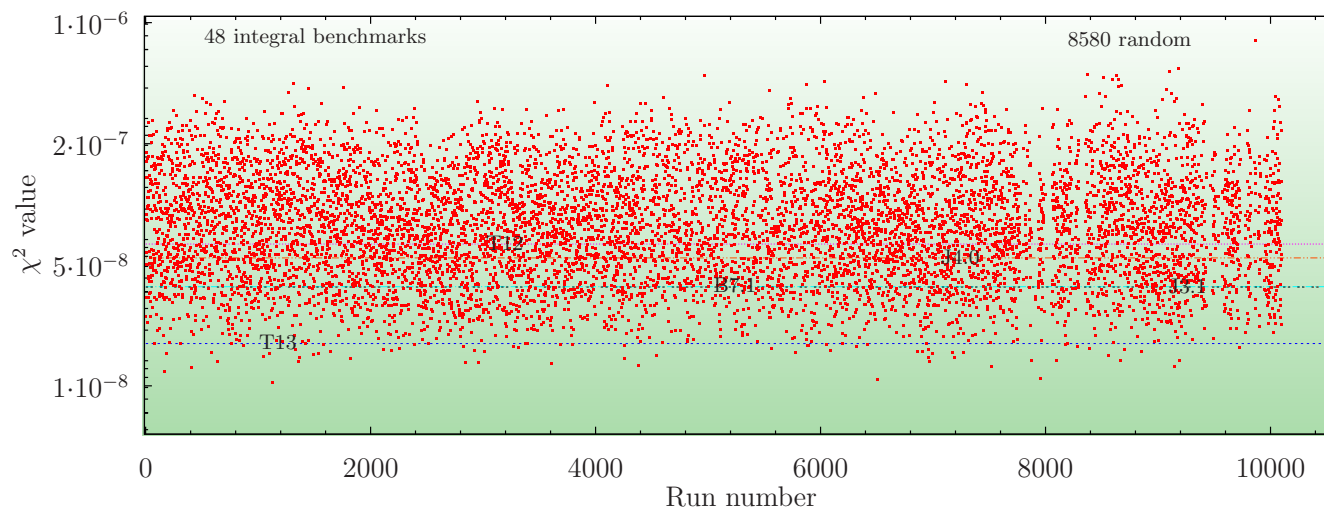
- ① F4E projects: end of Grant 168.01 and start of Grant 168.02,
- ② EU/EZ projects: end of ANDES, beginning of CHANDA, ESNII, SAFETAL,
- ③ CCFE: collaborative development and validation of FISPACT-II with TENDL,
- ④ Uppsala/Vattenfall: calculation for Ringhals,
- ⑤ Uppsala: uncertainties for the ELECTRA Lead Fast Reactor,
- ⑥ UAM-7/AREVA: using integral benchmarks for uncertainties on fuel storage,
- ⑦ GRS, PSI: more work is needed (time), but ideas are there,
- ⑧ KAIST/KAERI interest in ^{135m}Xe ,
- ⑨ UPM (Madrid): use our random files for full core uncertainty calculations,
- ⑩ TENDL in JEFF-3.2 (released in March 2014): 150 isotopes over 473 from NRG.

TENDL citations: 2009: 5, 2010: 15, 2011: 50, 2012: 48, 2013: 56, up to june 2014: 48

Example of the search for the universal ^{239}Pu files



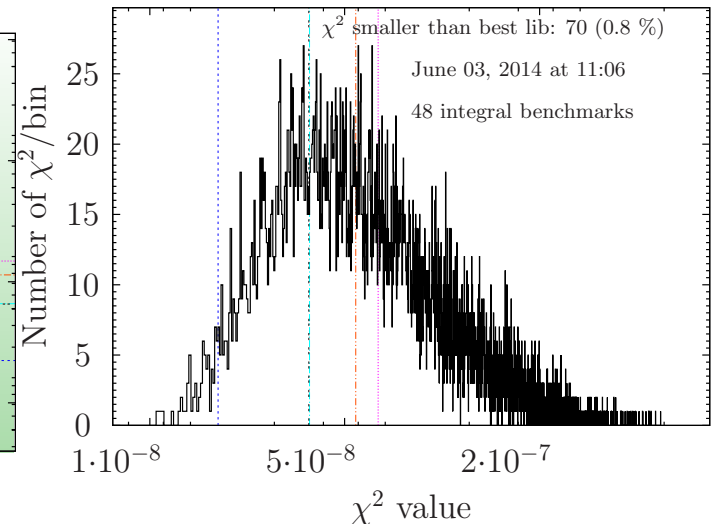
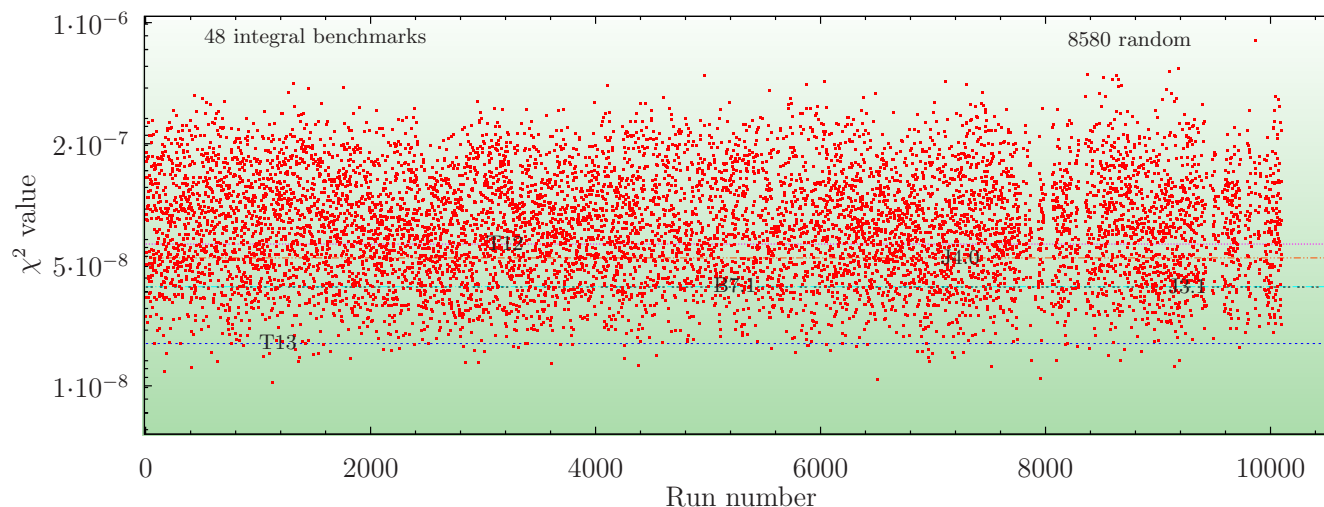
- ➡ Produce 10 000 random ^{239}Pu files with TALYS,
- ➡ Select some criticality benchmarks (16 thermal, 1 intermediate and 21 fast),
- ➡ Run these 48 benchmarks for each random files (everything else is equal to ENDF/B-VII.1),
- ➡ Calculate the distance and select the file with the minimum distance.



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No biggie. What if we do it for JENDL-4.0, JEFF-3.2 and ENDF/B-VII.1 ? The union of the best files might lead to the "best best-file"...

Near future



- ① Improve TENDL and release TENDL-2014,
- ② Produce new random files for minor actinides,
- ③ Find the universal file for ^{239}Pu ,
- ④ Finish the work with Vattenfall (Ringhals storage),
- ⑤ Save NRG,
- ⑥ ...