

Work description for Task 6.1 in FPA-168 (Grant #1)

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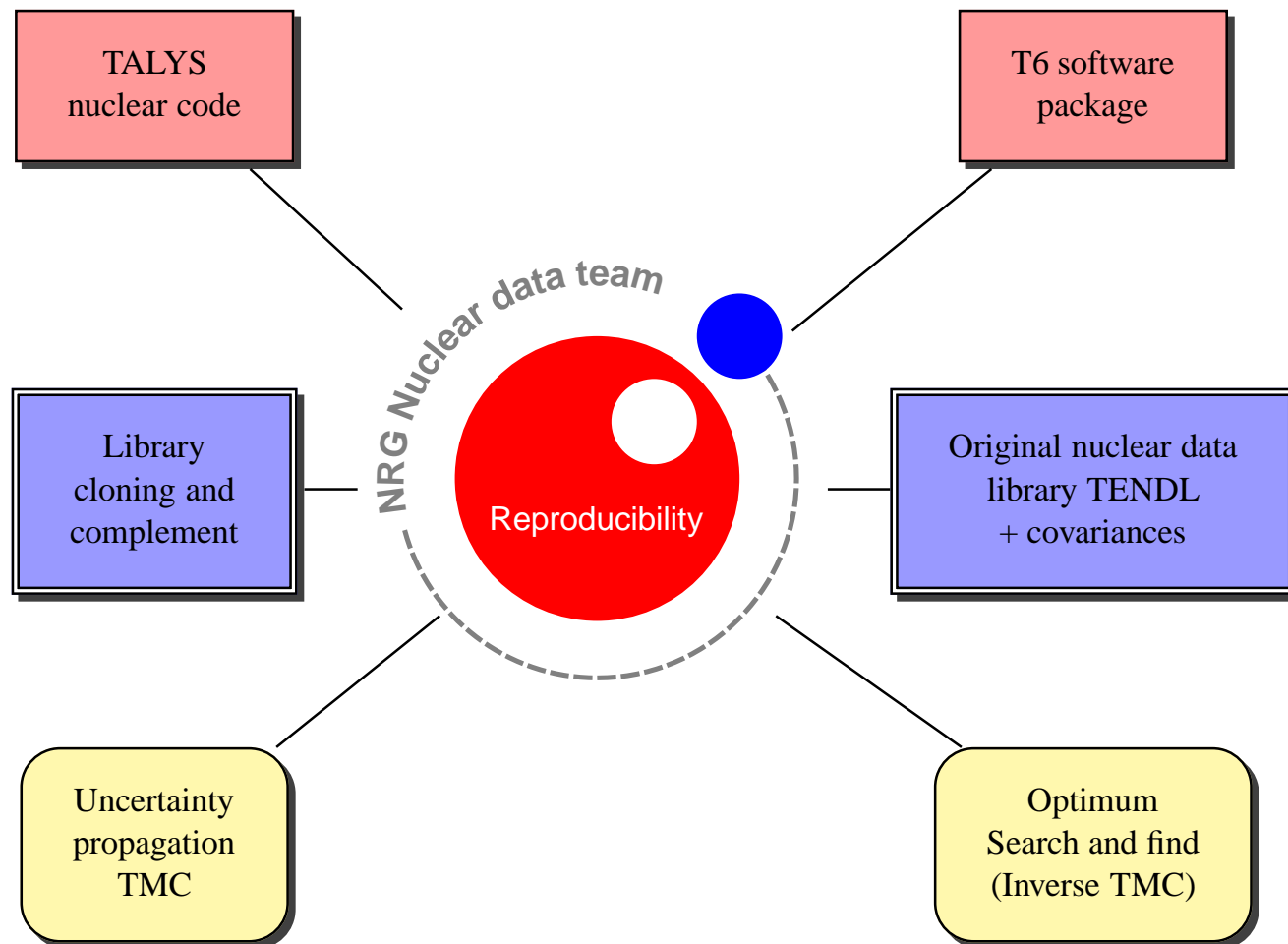
EFF/F4E FPA-168, NEA Paris, April 2012

Objective & deliverables



Objective: Development of consistent TALYS model based activation-transmutation and transport TENDL neutron sub-libraries. Verification and validation of the processes and data streams.

Deliverable: report at month 18

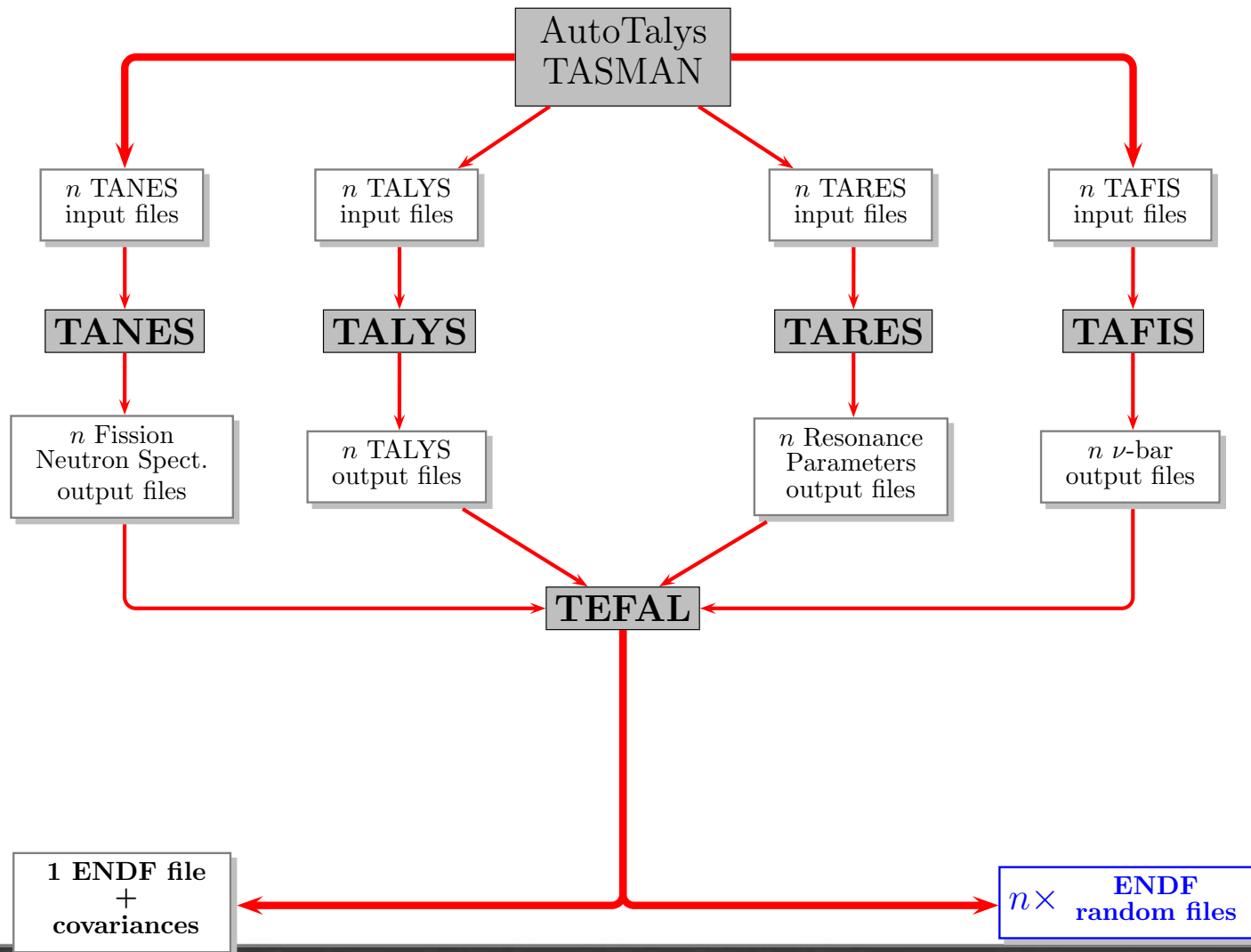


Resources and time schedule



Resources: A. Koning and D. Rochman (and see plot)

Time schedule: (1) December 2012: produce TENDL-2012; (2) apply possible correction in 2013 and produce a new TENDL



1. Produce TENDL-2012 based on previous TENDL models



- Available at www.talys.eu/tendl-2011
- Neutrons: ENDF files (MF1-15 and MF31-35), plots, ACE, EAF, processed files and **random** files (do your own Total Monte Carlo)
- Protons, deuterons, tritons, alphas, gammas: ENDF, ACE, EAF files
- Based on TALYS + **automatic normalization**

	Neutron	Proton	Deuteron	Triton	Alpha	Helium3	Photon	Fi. Yields
TENDL-2011	2425	2429	2419	2431	2429	2428	2428	574
TENDL-2010	2394	1157	1159	1156	1159	1140	1152	529
TENDL-2009	2375	1163	1164	1116	1163	1127	1165	509
TENDL-2008	348	344	336	339	342	338	327	
(JEFF-3.1)	381	26						44
(ENDF/B-VII.0)	393	48	5	3			163	80

2. Extensive content: ^{19}F to ^{281}Ds ($t_{1/2} > 1 \text{ sec}$)

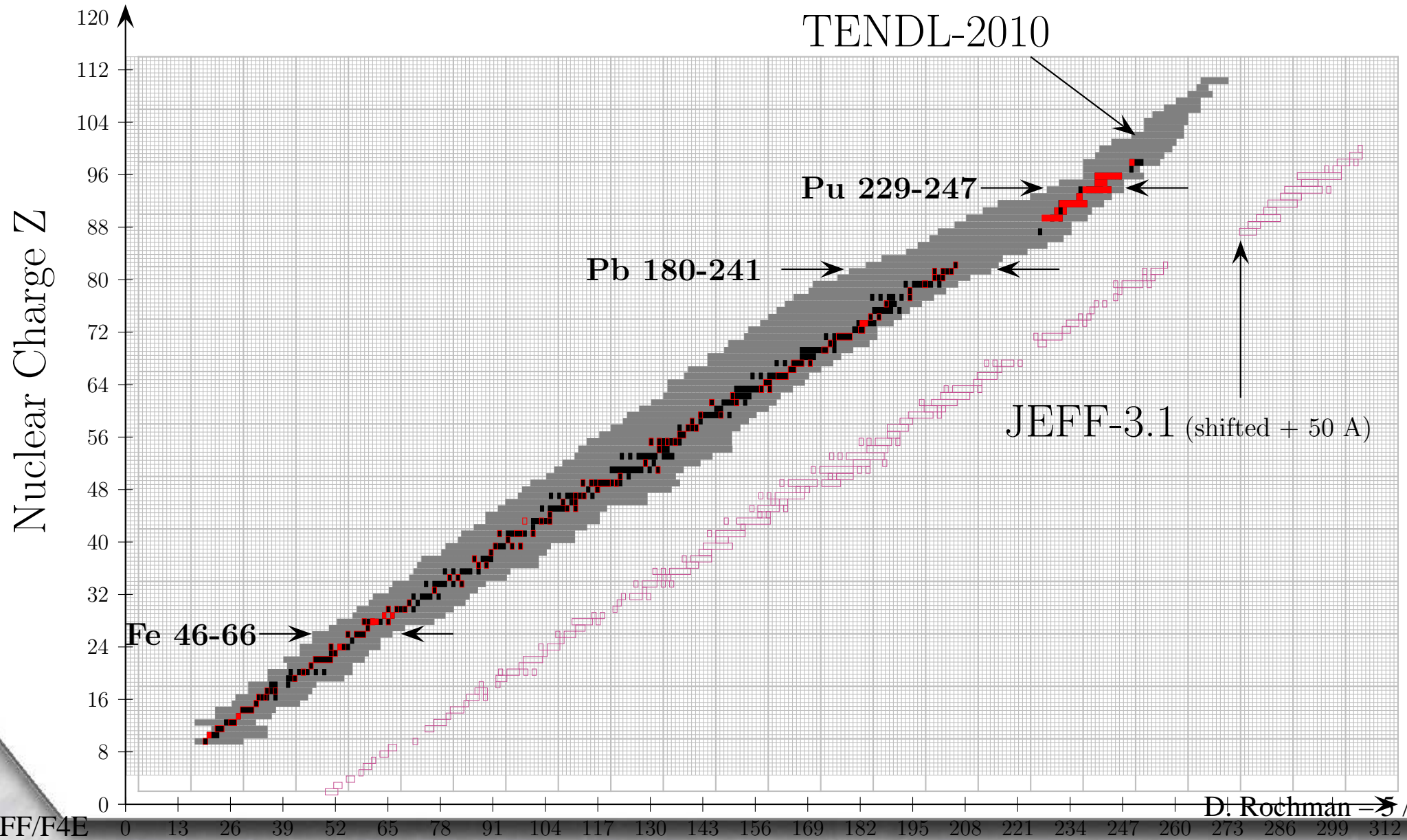


Default Calculations

Medium Quality

Activation Quality

Better Quality



2. Available files



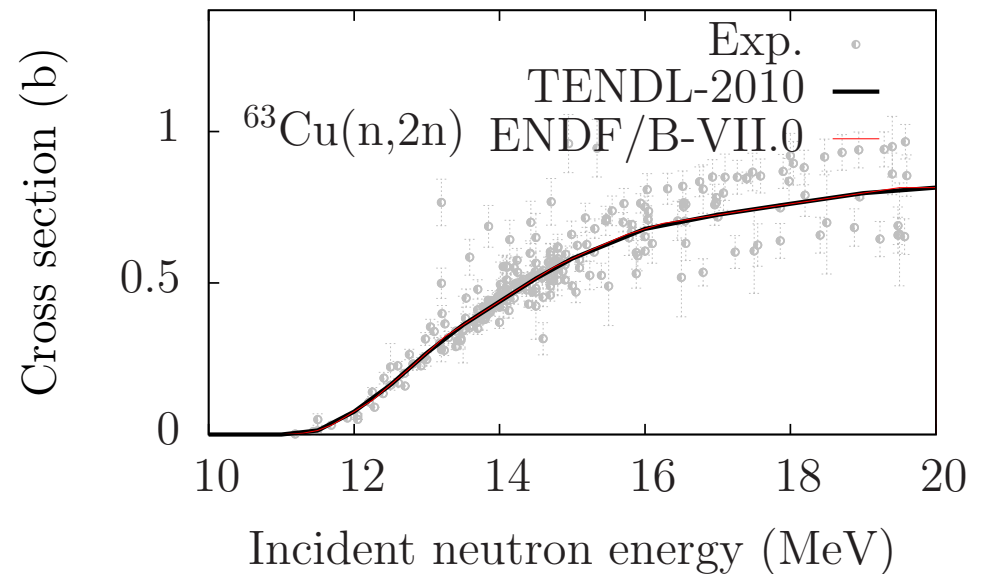
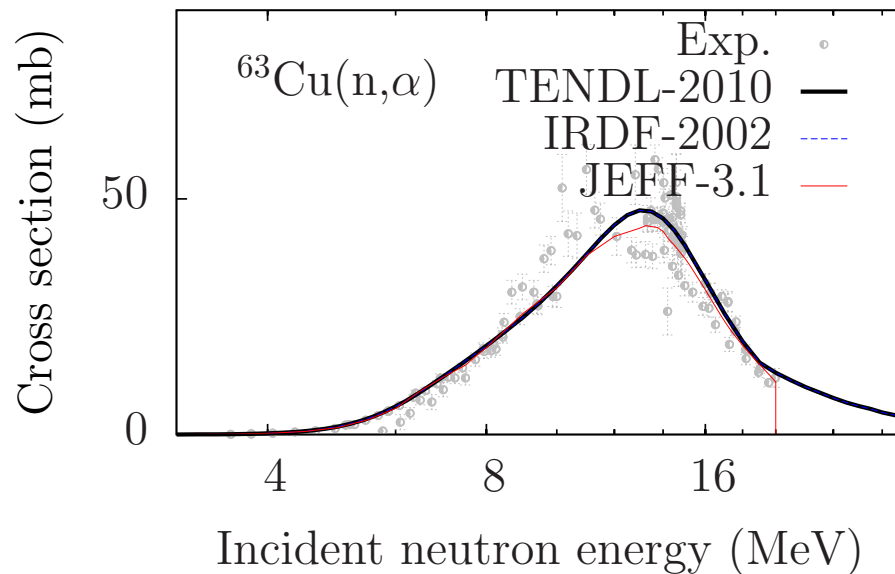
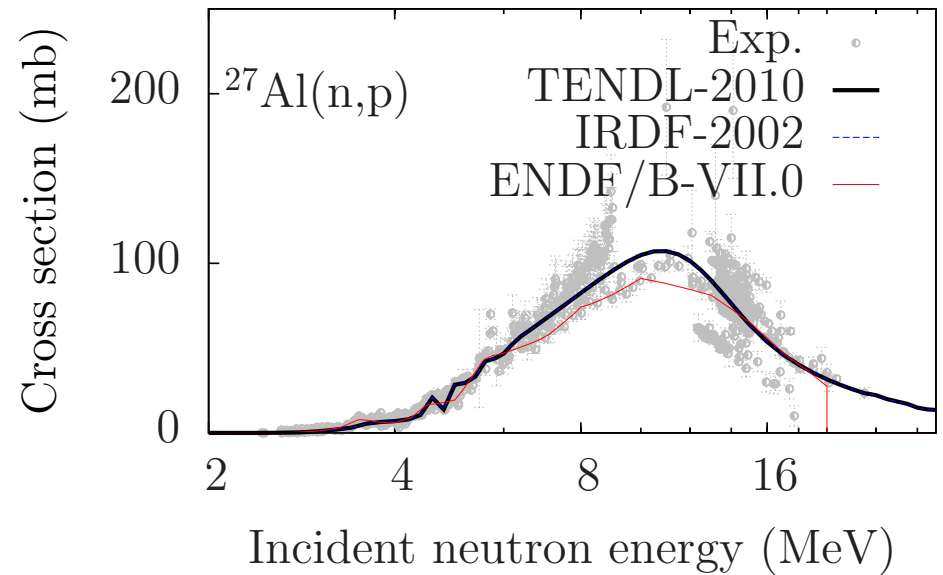
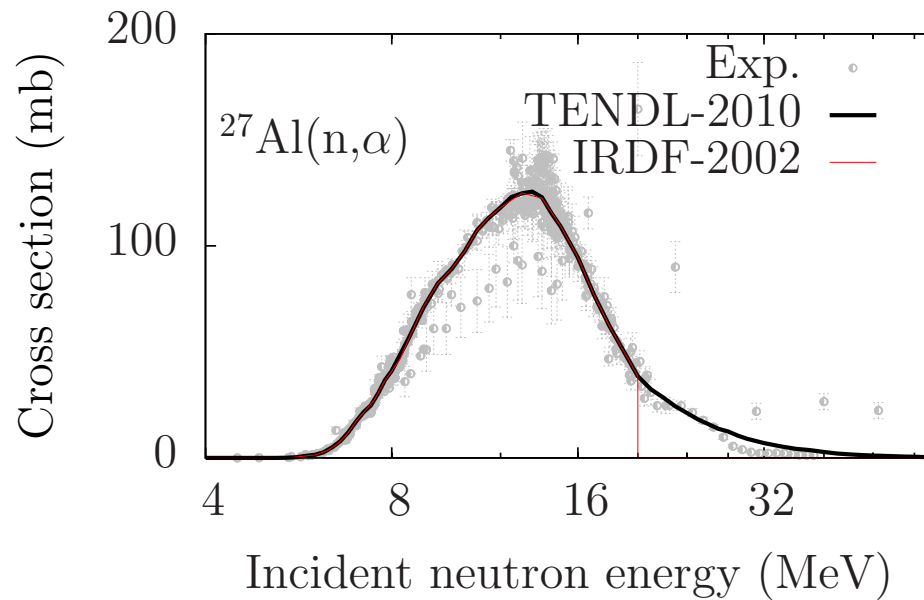
- ① **ENDF** files: formatted in the ENDF-6 format, up to 200 MeV for isotopes with half-life longer than 1 sec, containing sections MF1 to 15 and MF-30 to 35. A pointwise version, called PENDF, is also provided
- ② Tabular angular distributions
- ③ Tabular Gamma-ray intensities
- ④ Tabular partial cross sections to discrete levels
- ⑤ Tabular residual cross sections
- ⑥ Tabular cross sections
- ⑦ **EAF** files: formatted following European activation files up to 60 MeV, containing sections MF3 and MF33
- ⑧ Processed **ACE** files (with NJOY)
- ⑨ Processed covariances (tabular and plots)

2. Available files



- MF-1: General information and fission parameters (average number of prompt, delayed and total fission neutrons, and fission energy release),
- MF-2: Resonance parameters (in Reich-Moore or Multi-level Breit-Wigner format),
- MF-3: Cross sections (total, elastic, inelastic, capture, (n,2n), fission, and others),
- MF-4: Angular distributions,
- MF-5: Fission neutron spectrum,
- MF-6: Double differential spectra, photon production, residual production cross sections and recoils,
- MF-8-10: Isomeric cross sections,
- MF-12-15: Gamma yields, angular distributions and spectra,
- MF-31-32-33-34-35: Covariance data for average number of fission neutrons, resonance parameters, cross sections, angular distributions and fission neutron spectra.

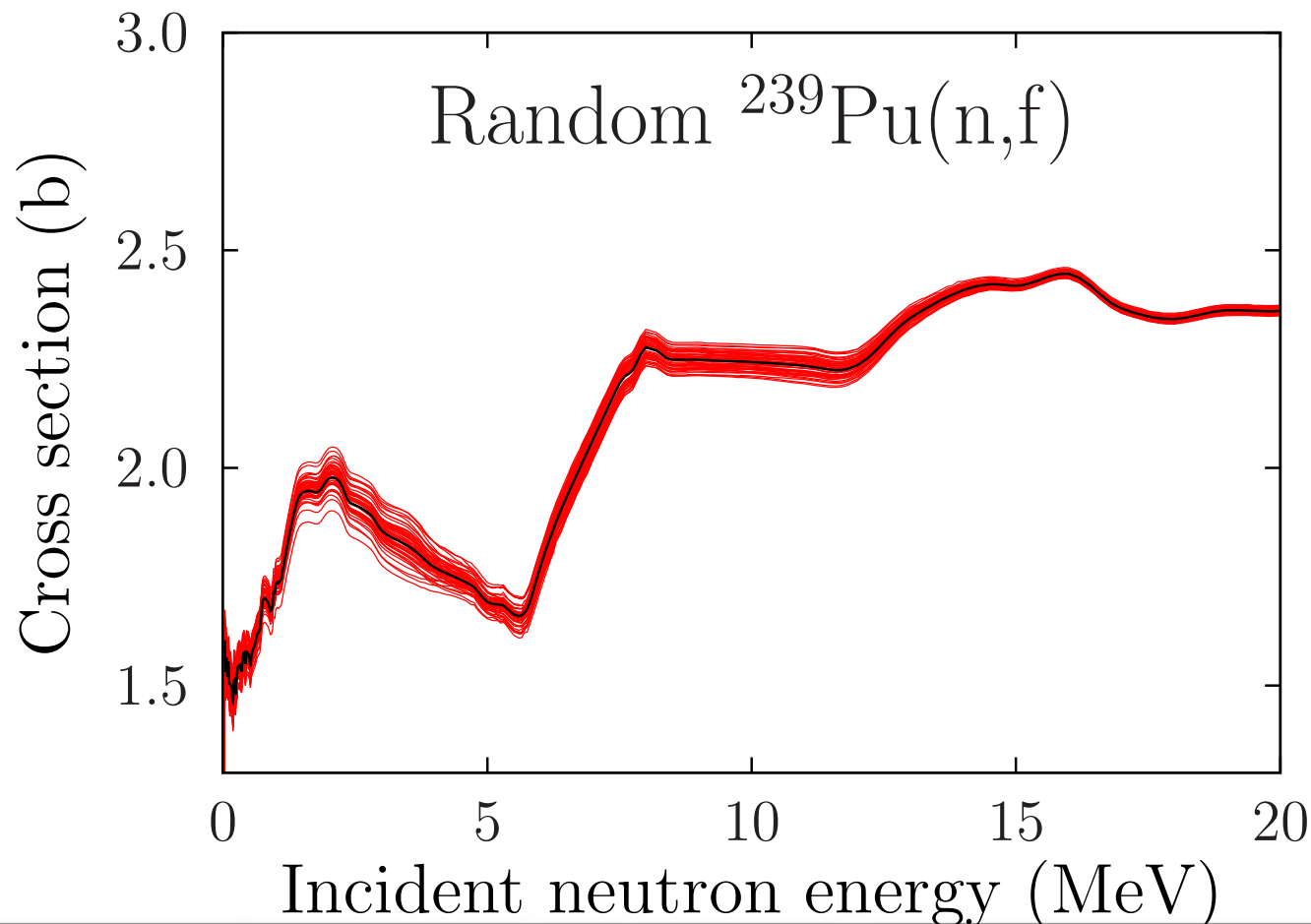
3. TENDL adjusted for activation



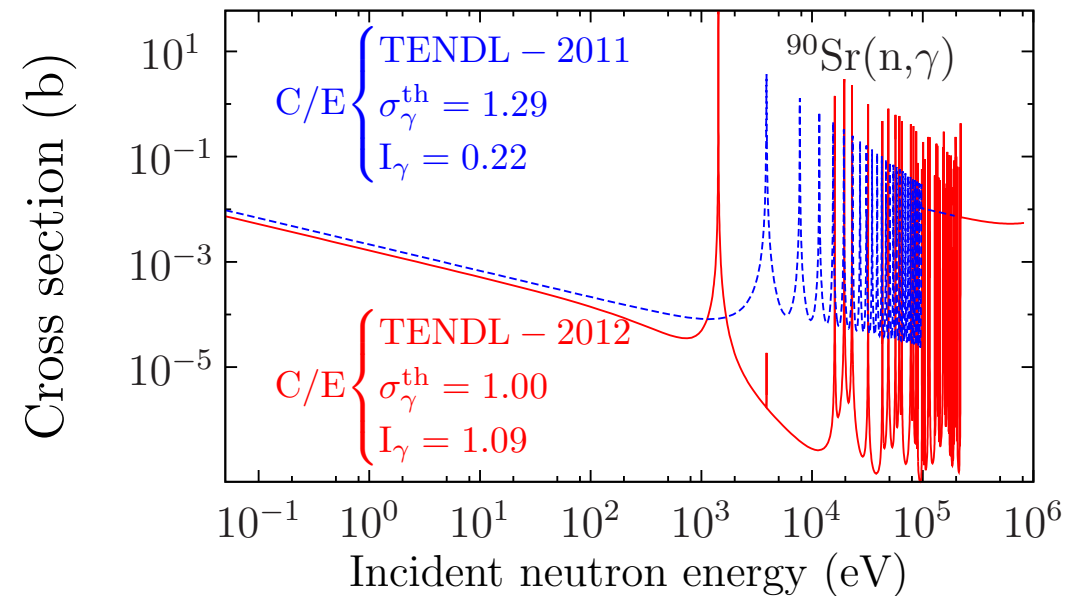
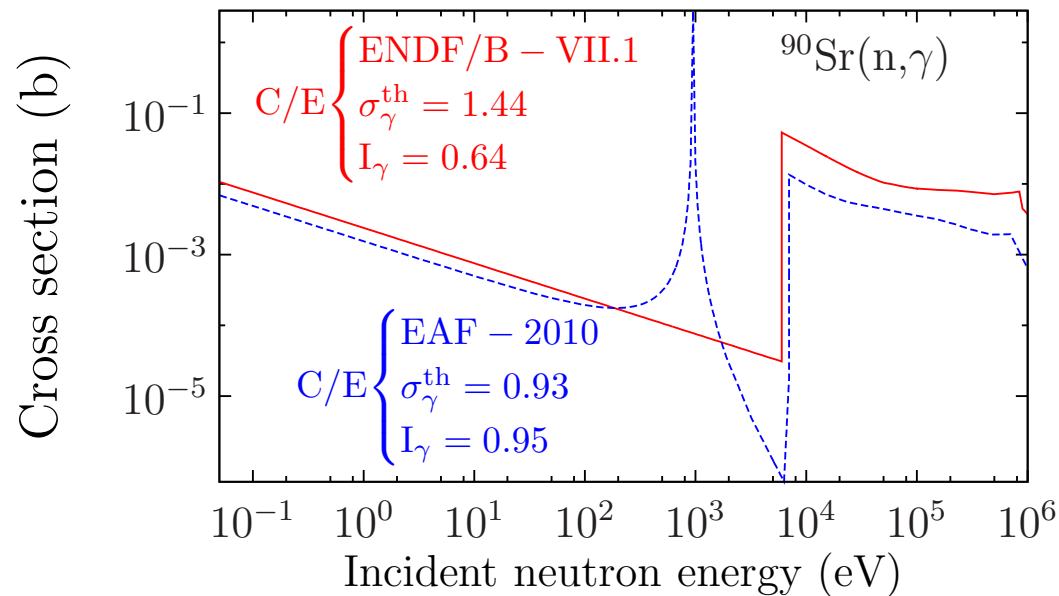
3. Why do we normalize to other data ?



- Because we want the best source (ENDF/B-VII.0, JEFF-3.1, JENDL-4.0, EAF, TALYS...) **now**
- We will get rid of many non-TALYS sources in the coming years
- We can generate random data (and covariances) around the best central values **now**



4. Include latest development (HFR data)



(see JEFF presentation)

4. Planned work



- ⇒ Development of TALYS for TENDL-2012/2013,
- ⇒ Publication scheduled in December 2012,
- ⇒ Include latest developments (HFR data...),
- ⇒ Adjustment/improvement for important cross sections (to EAF) with the Petten method,
- ⇒ Produce adjusted covariances,
- ⇒ Verify the file format and processing with ENDF checking codes, NJOY, PREPRO and others...
- ⇒ Finally produce the deliverable