# Status of T6 and related software

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Rule number 1 for data reproducibility, automation, mass production and efficiency

- All historical nuclear data of importance needs to be available all at once, on the spot, NOW.

- This holds for all existing ENDF libraries, Atlas or resonances, EXFOR etc.

- Two options:

  - (Very) Large complete databases: used for the "big 3 T's": TALYS, TENDL, TMC

  - command-line API's (not available)
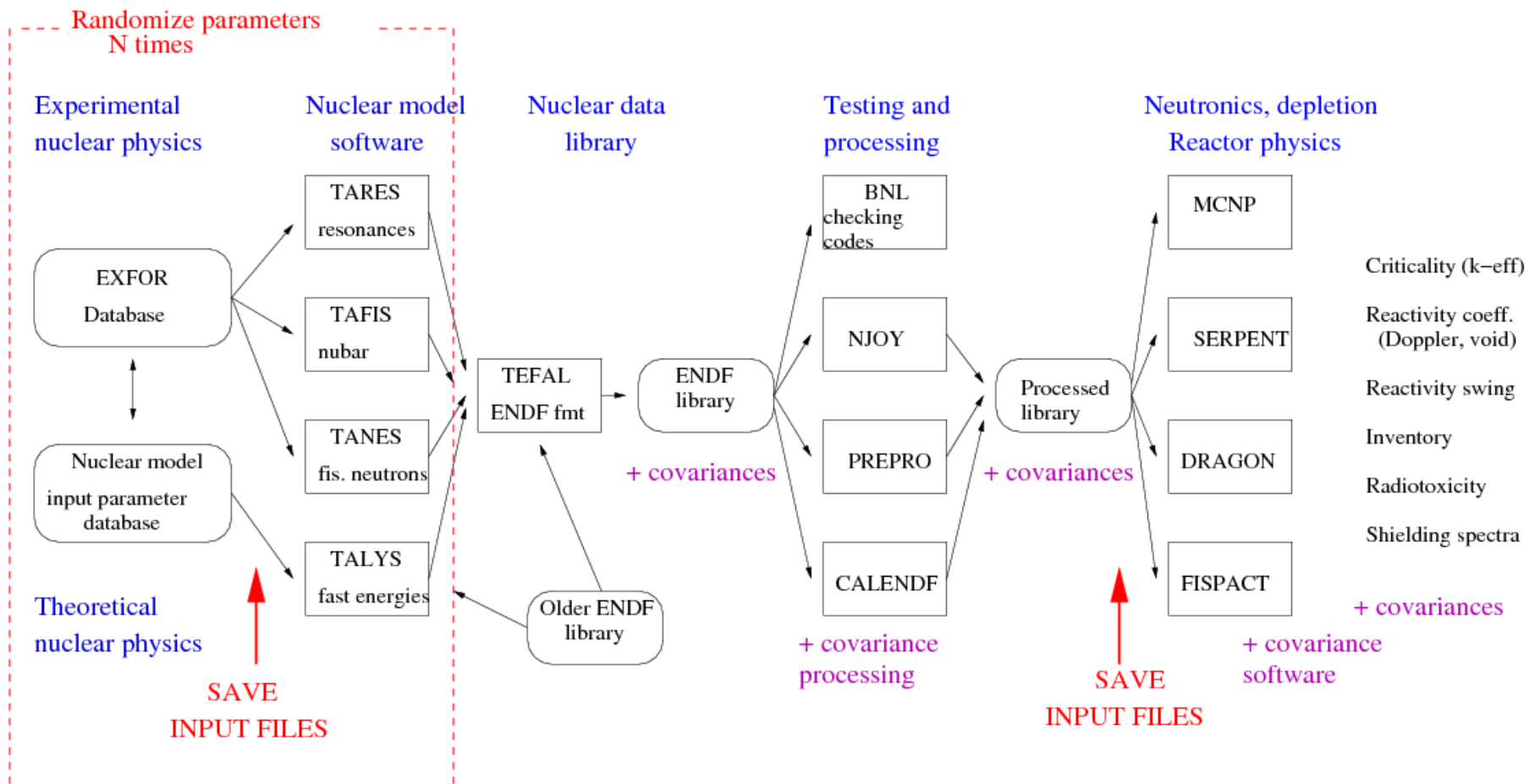
TENDL-2019, what is new ?

- <u>TARES-1.4</u>: resonance formatting and analyzing tool

- Measured/compiled/evaluated resonances:
  - ☐ Based on latest JENDL-4.0, ENDF/B-VIII.0 and JEFF-3.3
  - ☐ Based on the latest Atlas, 6th edition (2018)
  - ☐ RESONANCETABLES: code to produce unifying and prioritized data library for thermal cross sections, resonance integral, MACS, D_0, Gamma_gamma, S_0 etc. based on Atlas, RIPL, EXFOR
  - ☐ **Best of all worlds, expect global superiority in RRR and URR**
- Statistical resonances:
  - ☐ Based on CALENDF
  - ☐ Translating the unresolved range from TALYS into statistically resolved range
  - ☐ Consistency between the RRR, URR and fast range

- Covariances in MF32 and MF33
  - ☐ Consistency between both format
  - ☐ Consistent with the random files (using the ENDSAM from IJS)

Thermal Cross Sections
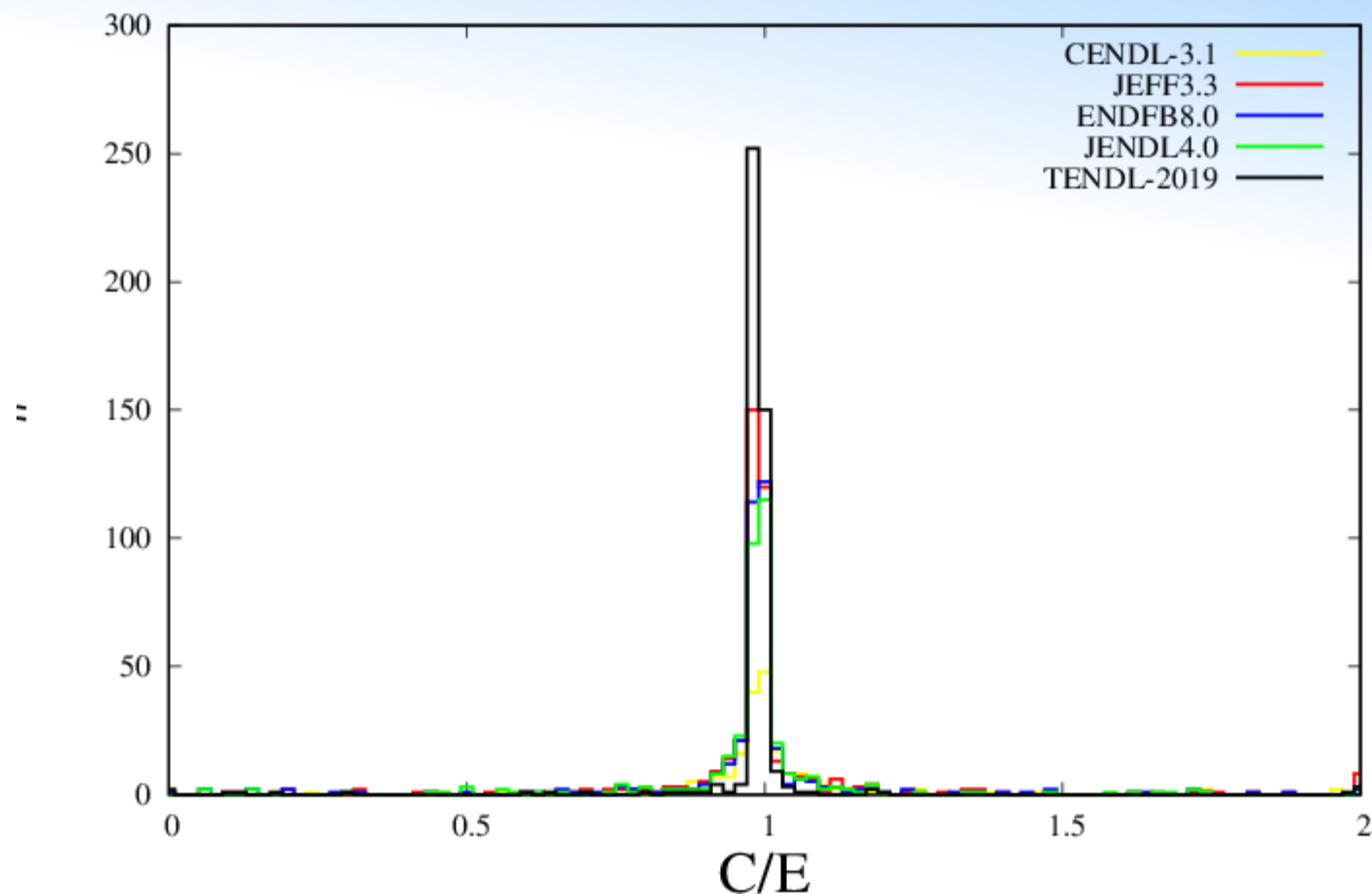
Lib	F(C/E)	N	N <5%	N < 20%	N < 50%
CENDL-3.1	1.036	201	129(0.642)	177(0.881)	187(0.930)
ENDFB-8.0	1.022	375	284(0.757)	332(0.885)	351(0.936)
JEFF-3.1	1.024	425	315(0.741)	377(0.887)	398(0.936)
JENDL-4.0	1.025	359	269(0.749)	320(0.891)	334(0.930)
TENDL-2019	1.008	446	416(0.933)	431(0.966)	434(0.973)

Resonance Integral
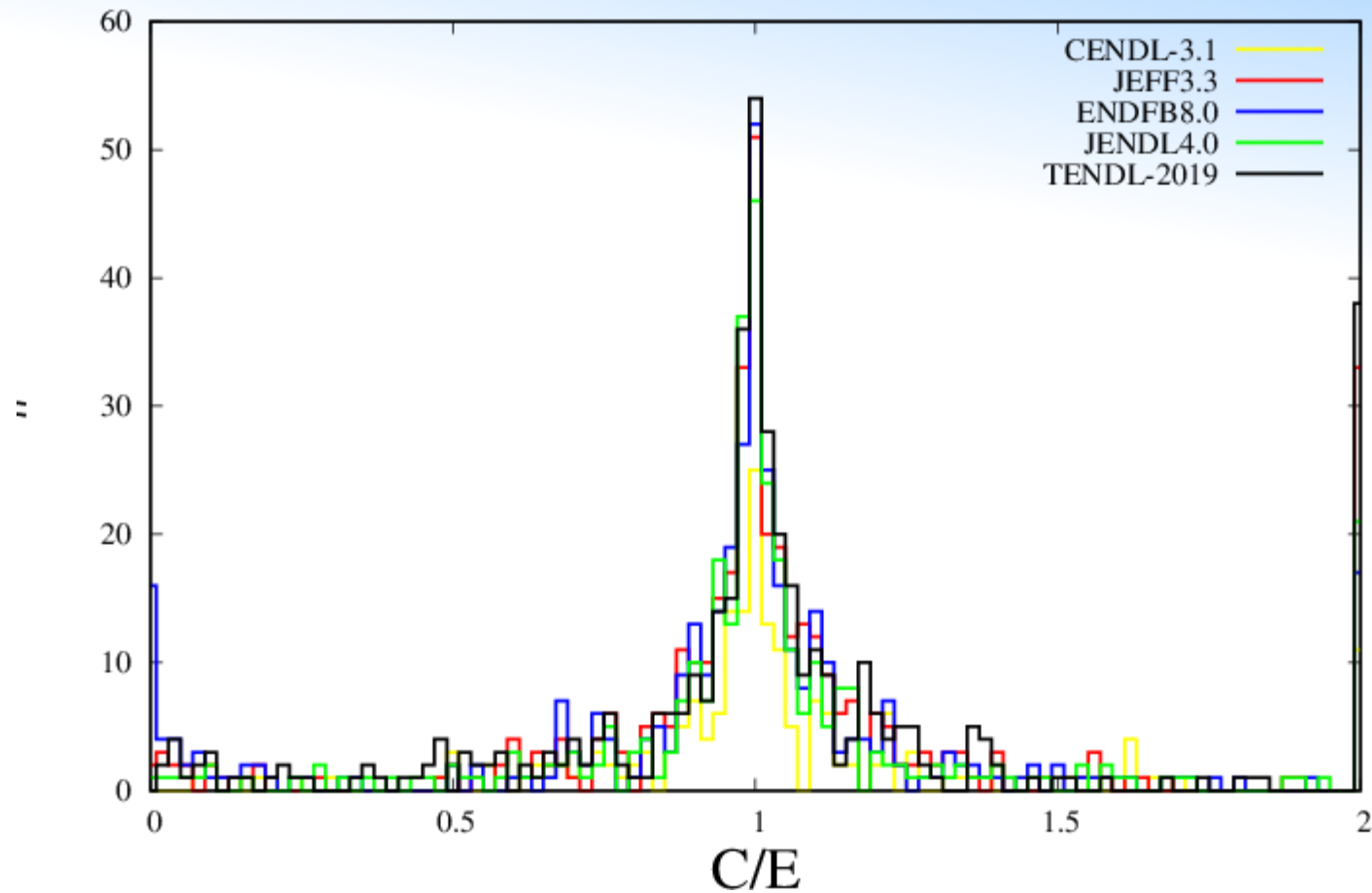
Lib	F(C/E)	N	N < 5%	N < 20%	N < 50%
CENDL-3.1	1.056	194	73(0.376)	126(0.649)	158(0.814)
ENDFB-8.0	1.060	377	138(0.366)	249(0.660)	300(0.796)
JEFF-3.1	1.059	386	133(0.345)	257(0.666)	312(0.808)
JENDL-4.0	1.054	334	133(0.398)	233(0.698)	275(0.823)
TENDL-2019	1.058	412	146(0.354)	263(0.638)	321(0.779)

Maxwellian-Averaged Cross Sections
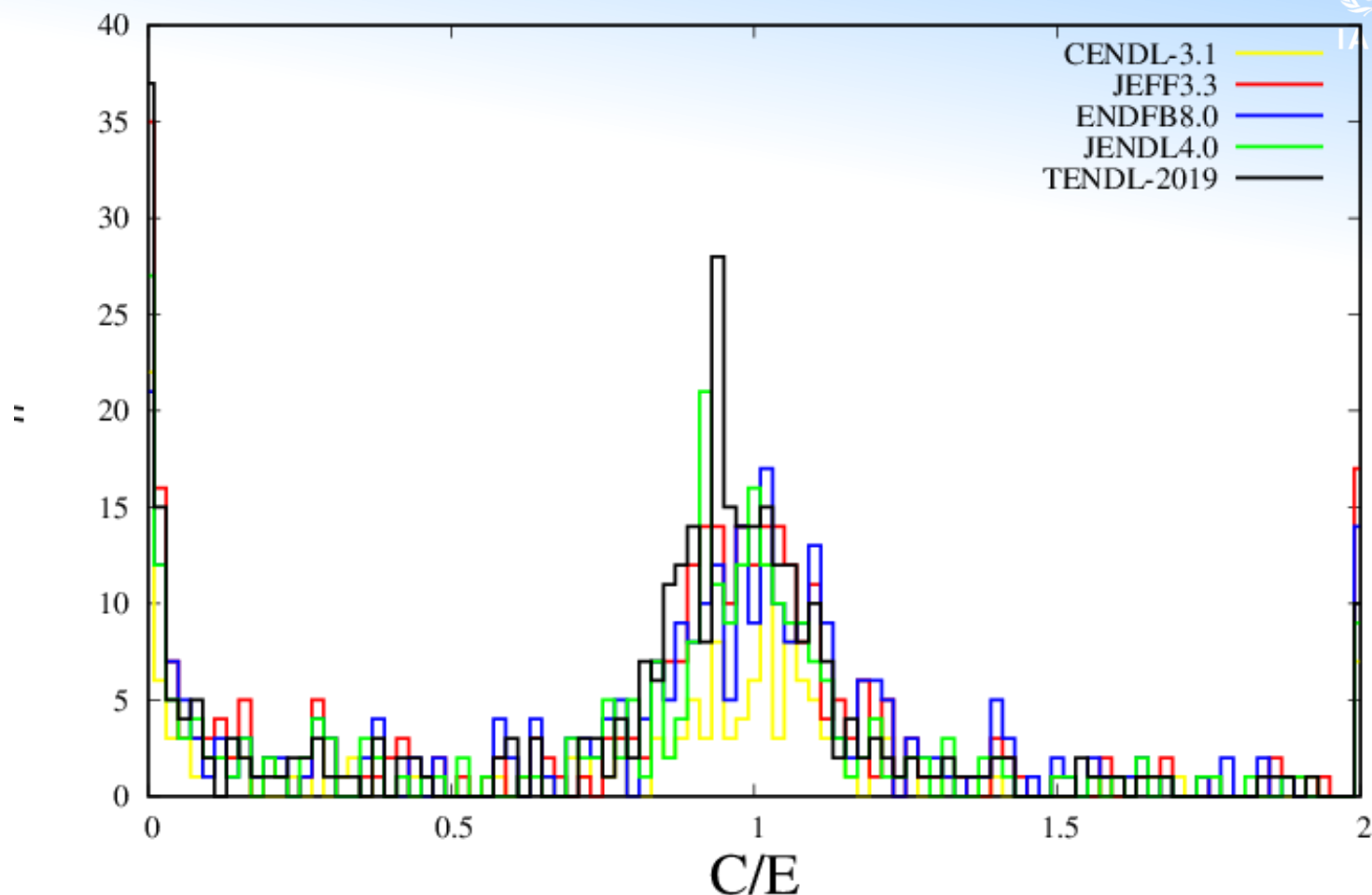
Lib	F(C/E)	N	N < 5%	N < 20%	N < 50%
CENDL-3.1	1.073	176	29(0.165)	78(0.443)	101(0.574)
ENDFB-8.0	1.082	328	56(0.171)	157(0.479)	208(0.634)
JEFF-3.1	1.078	346	67(0.194)	175(0.506)	208(0.601)
JENDL-4.0	1.070	292	59(0.202)	149(0.510)	187(0.640)
TENDL-2019	1.076	357	75(0.210)	196(0.549)	233(0.653)

YAML-like quality scoring for EXFOR

- Quality scores for 28455 EXFOR subentries
  - Natalia Dzysiuk for activation c.s. + Ni: 2336 subentries
  - Erwin Alhassan for proton induced reactions: 166 subentries
  - Natalie Gaughan for proton induced reactions: 103 subentries
  - Arjan Koning: NEA/DB/DOC(2017)1: 25850 subentries

subentry: 21289020
  evaluator: Natalia Dzysiuk (2018)
  quality : 1
  comment :
          data were used for evaluation

subentry: 21440014
  evaluator: Natalia Dzysiuk (2018)
  quality : 0
  comment :
          data were not used for evaluation
          possible extra error from the low energy neutrons

subentry: 30336037
  evaluator: Natalia Dzysiuk (2018)
  quality : 0
  comment :
          data were not used for evaluation
          an overestimated value of monitor cross section

T6 status

- TALYS: still working on TALYS-2.0 + tutorial, Fortran-95 modularity taken one level back (half year delay, at least)
- TEFAL: as above
- TASMAN: as above
- Will start using gitlab only with 2.0 versions of codes
- T6 too big and complicated for gitlab at the moment: 2 Gb tarred, need to separate libraries from source codes and scripts, especially for TALYS. T6 available for anyone who requests it, distribution via One-drive.
- Working on "Tools for TALYS" Tutorial explains full T6 system, the use of autotalys, how to produce TENDL and all other libraries generated.

Other software

- EXFORTABLES: EXFOR statistical analysis and human+machine-readable database
- RESONANCETABLES: Unifying basic quantities in the resonance range (thermal xs, Res Int, MACS, etc.)
- ENDFTABLES: Decompose ENDF libraries into directory-structured x-y tables
- all above are needed for data reproducibility as long as versatile command-line API's ("getexfor", "getendf", "geticsbep") have not been produced by the community.
- All produced libraries/, exfortables/ etc available on request via One-Drive

Thank you!