Opening remarks and Library Status

D. Brown, National Nuclear Data Center, BNL

- **Appoint Rapporteur/Note taker**

- **Where we are now**
  - This session
  - Validation session
  - Covariance session
  - Formats session (ENDF-6)

- **Where are we going**
  - Measurements session
  - Evaluations session
  - Formats session (GNDS)
  - NDAG
  - NDWG

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This morning and in these sessions, we will resolve loose ends for ENDF/B-VIII.0

- NDAG
- NDWG

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- **Where we are now**
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While we discuss this, keep in mind big question: should we delay library a month or so?

- NDAG
- NDWG

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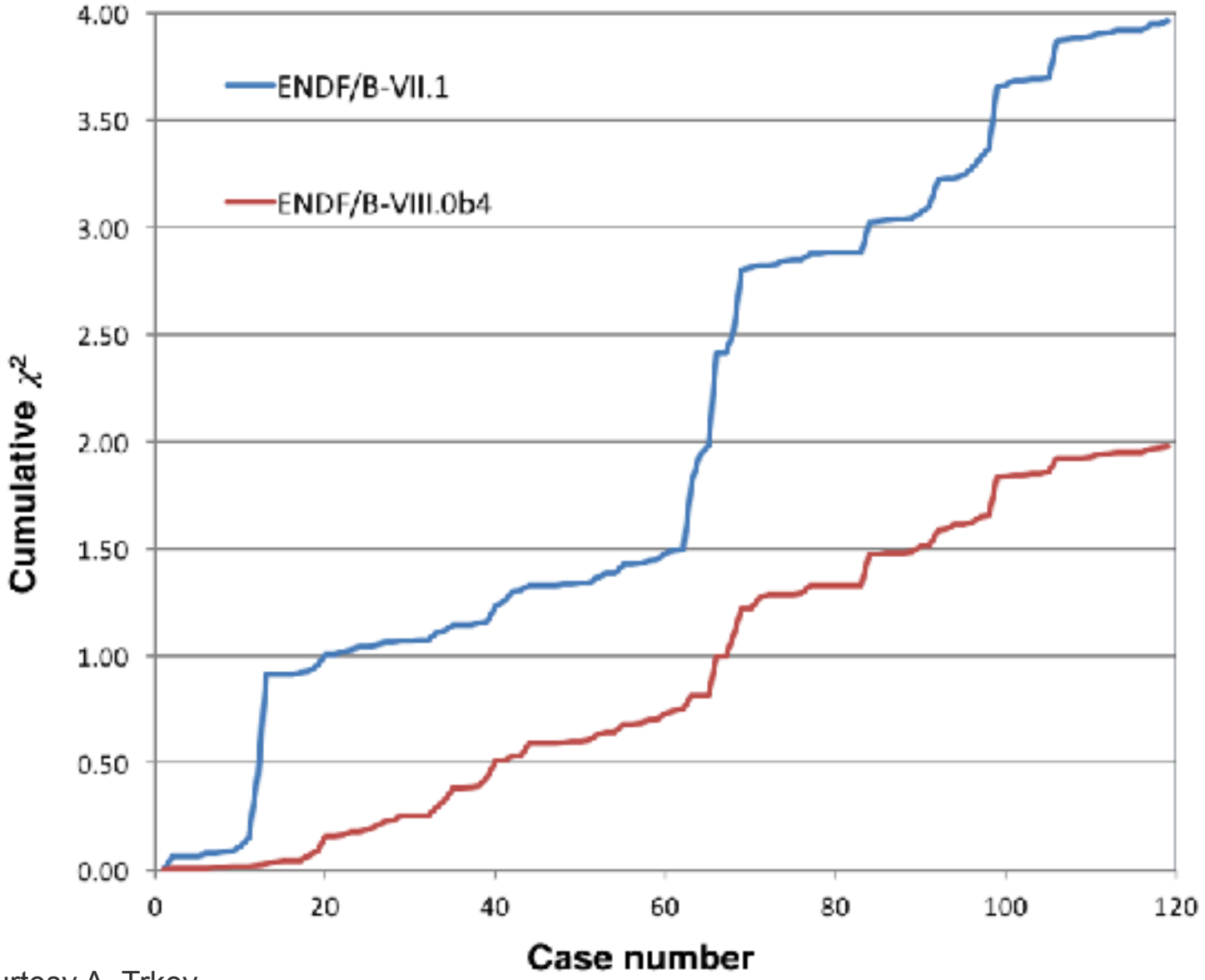
This is a d*mn good library

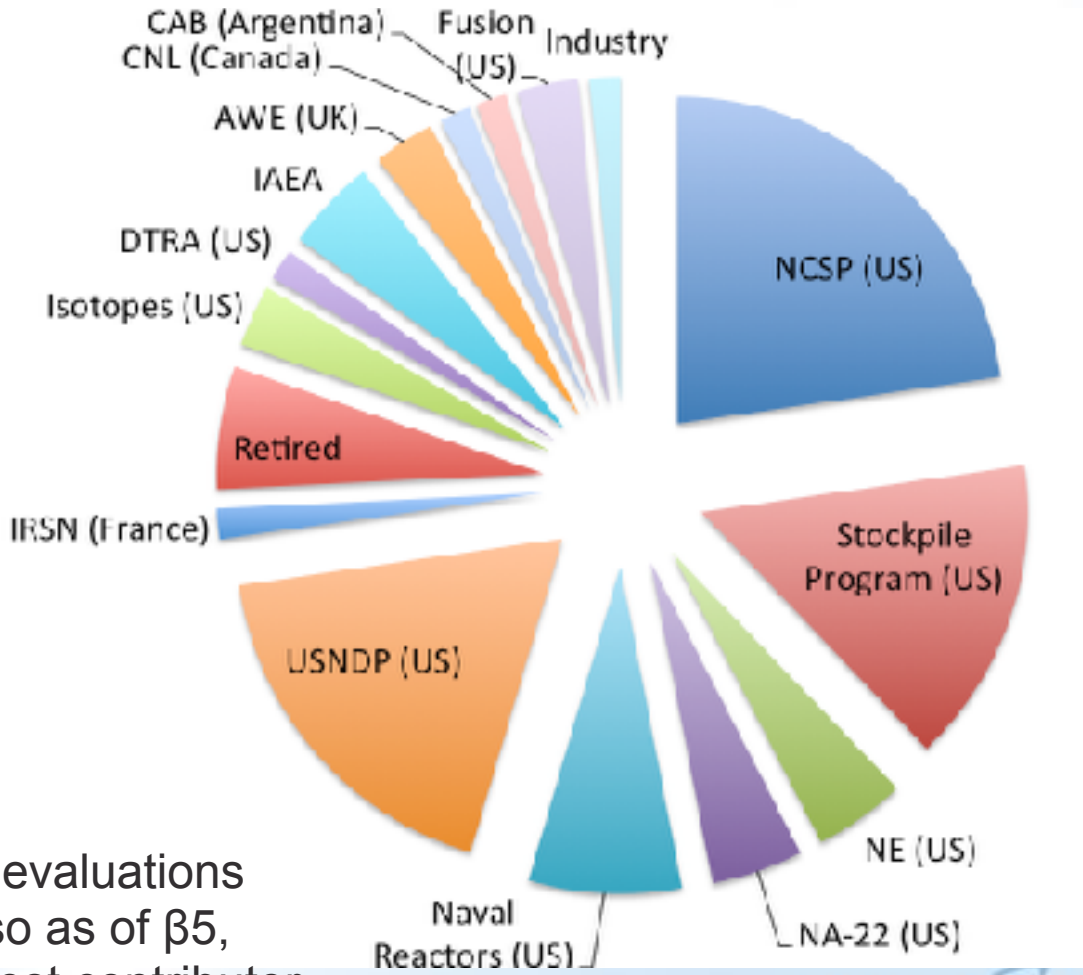


Plot curtesy A. Trkov

The ENDF/B library is the product of the Cross Section Evaluation Working Group (CSEWG).

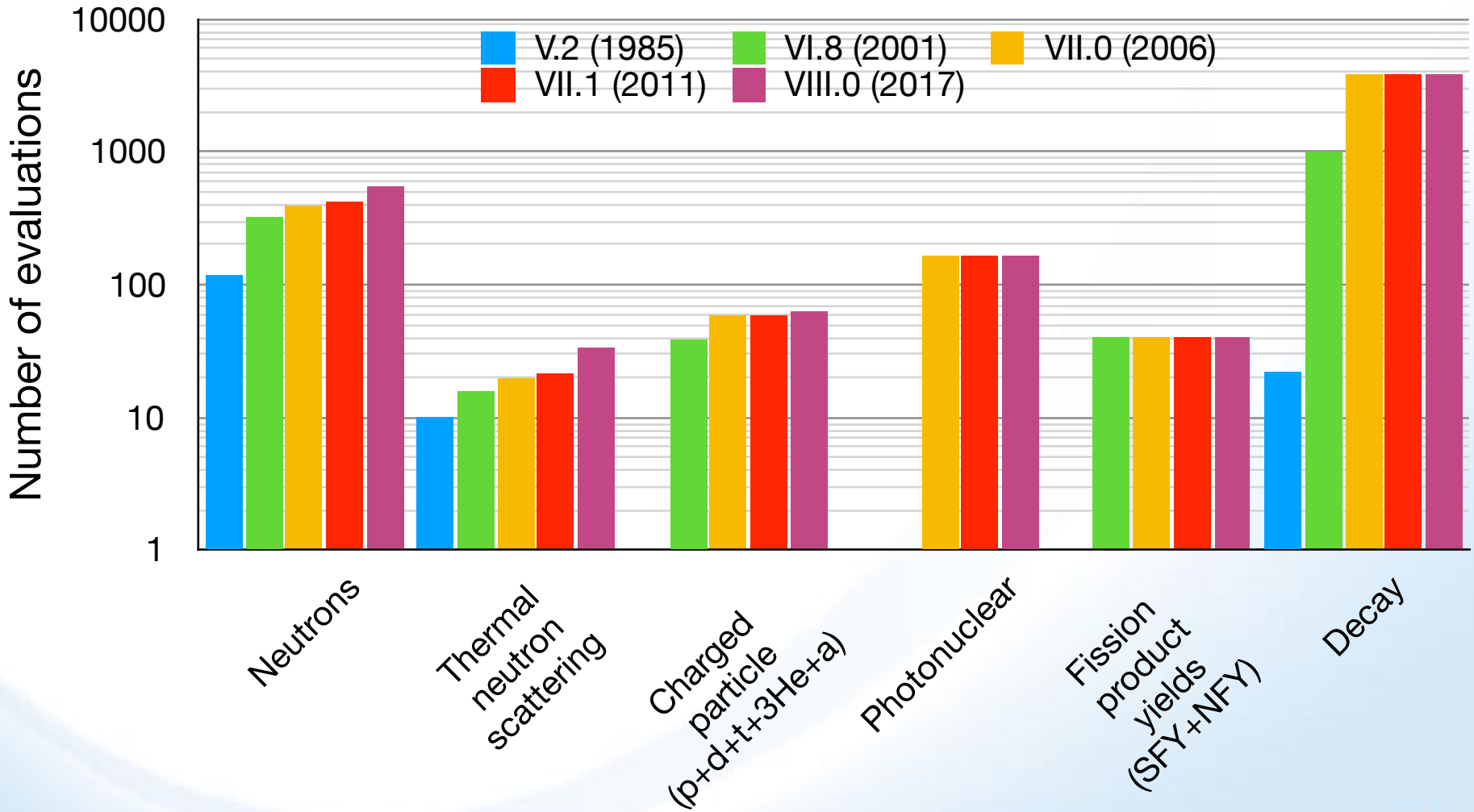
CSEWG is a long standing collaboration between data users who, incidentally, are also the biggest content providers

Fraction of evaluations provided for ENDF/B-VIII.0β3

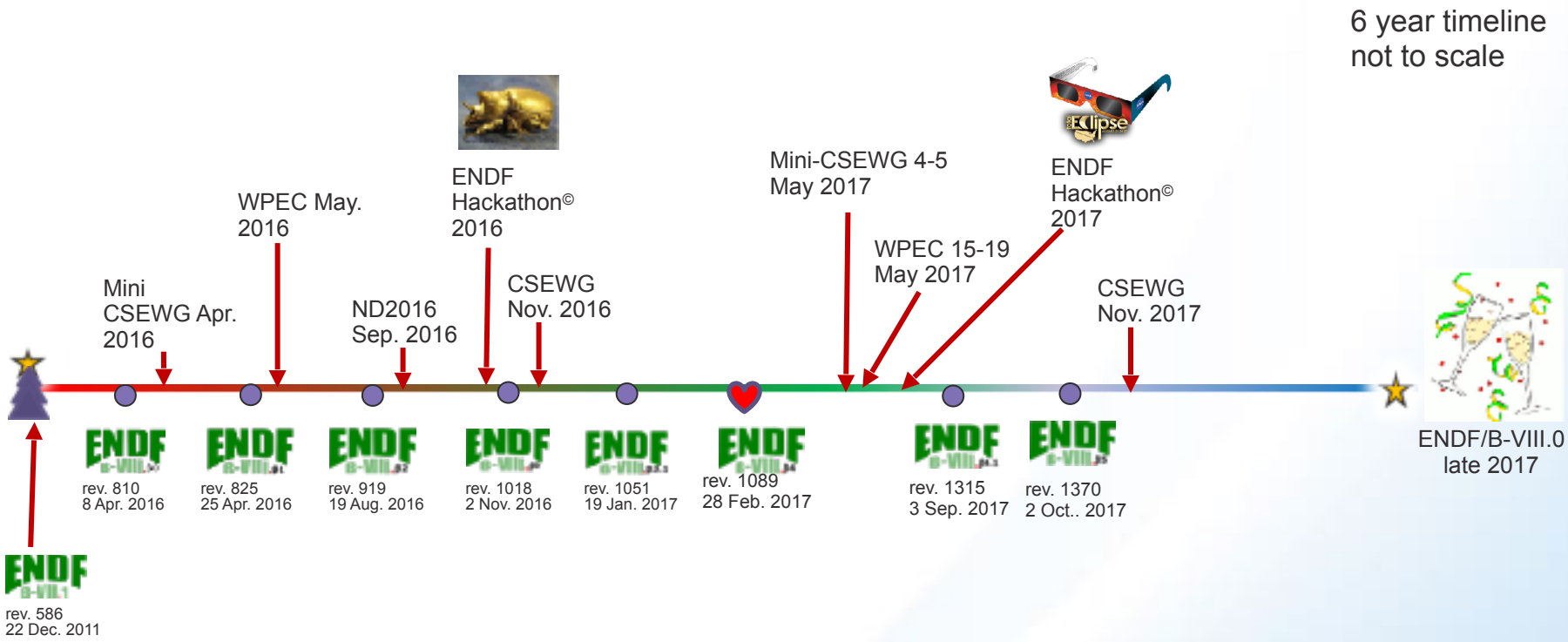


We added 125 evaluations over summer, so as of β5, USNDP is biggest contributor

ENDF/B-VIII.0 is biggest library yet



ENDF/B-VIII.0 on track for late FY17



Recent changes

What happened in beta4.1?

Finalize CIELO mean values

^{2}H angular distribution

^{nat}C removed

heavy water

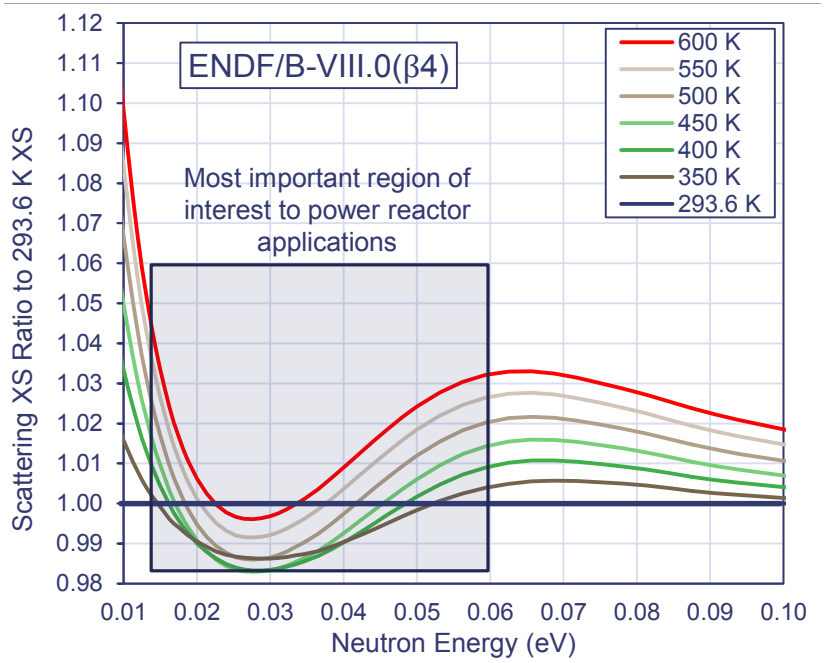
light water decision point

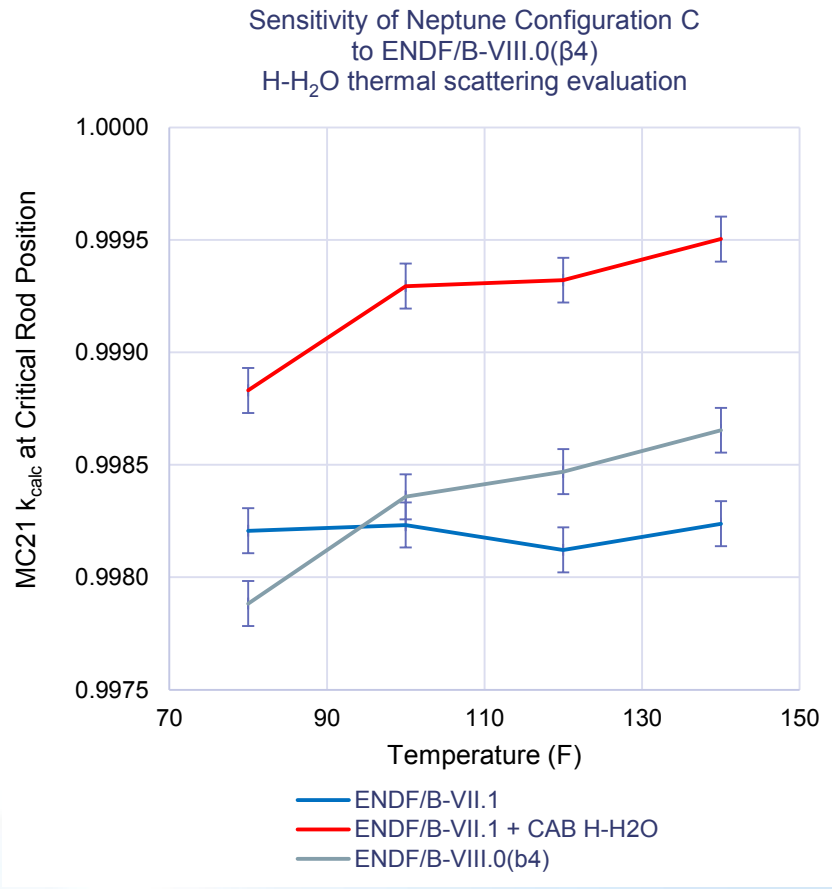
TENDL+EMPIRE:

- 125 evaluations,
- all holes filled,
- all > 1 year
- missing elements: Ne, Pt, Po

Absurd number of fixes (Hackathon)

Light water TSL issues





β4 light water led to elevated reactivity at high temp — *we will discuss this morning*

plots from J. Holmes, mini-CSEWG in April 2016

What happened in beta5?

graphite (reactor & crystalline) updated

Covariances added for CIELO and standards files

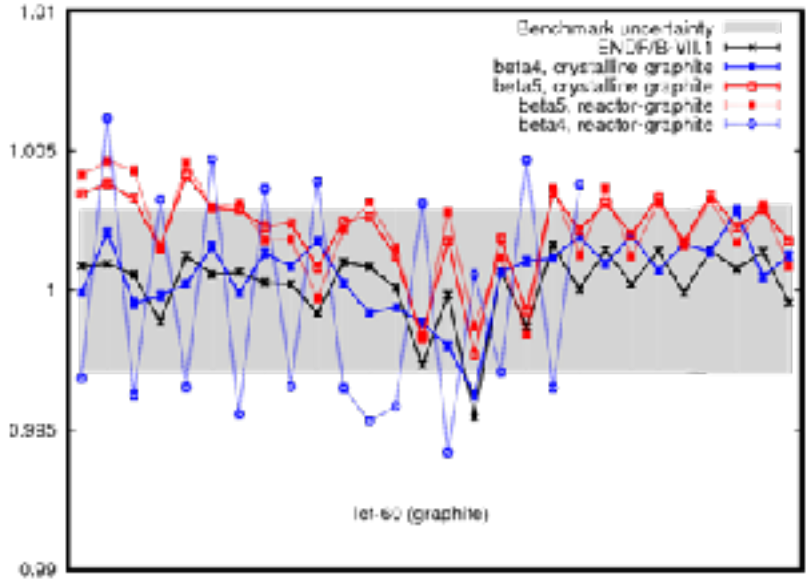
minor Fe extended to 150 MeV

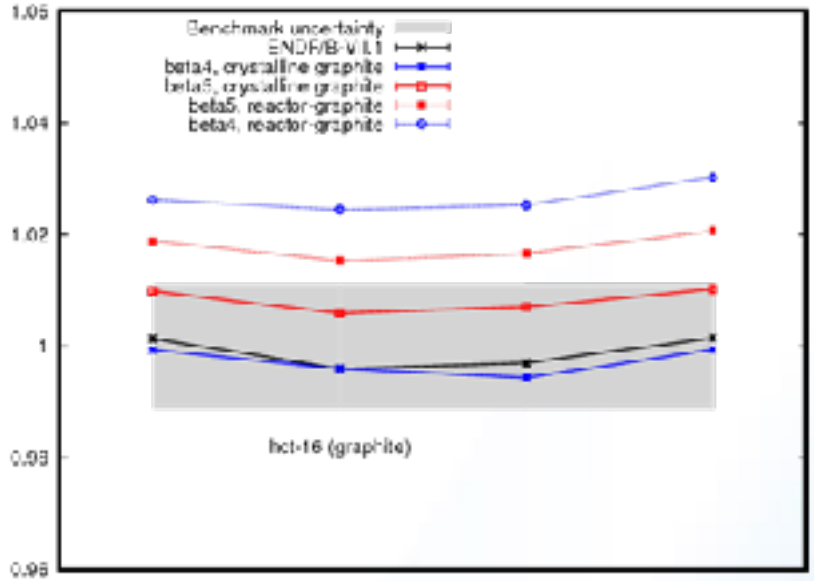
Bug fixes, especially for MT32 covariances

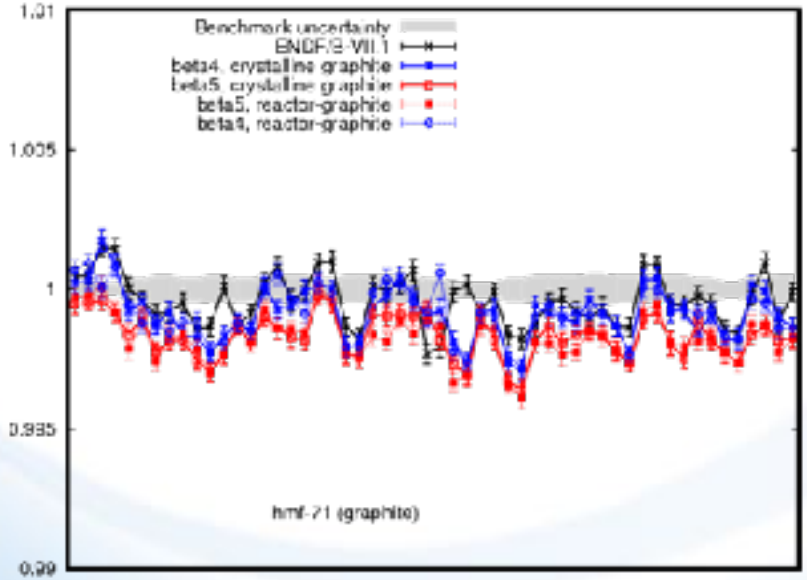
Graphite TSL issues

- **graphite (reactor and crystalline) updated on 21 Sep 2017, 2 weeks AFTER β4.1 tagged**
- **It changes criticality & we agreed was no-no**
- **Ignited email firestorm**

Testing from S. Van der Marck







Clearly both variants of graphite worse in beta5

TABLE. 1: RESULTS FOR HCT-016, CASE 4 (T = 27°C)

	ENDF/B-VII.0*	**ENDF/B-VIII.0β5†**	**Comments**
RG beta4	1.04365	1.03747	Tsl-reactor-graphite from β4
RG beta5	1.02513	1.01937	Tsl-reactor-graphite from β5
(corrected coh)	1.01530	1.00976	Reactor graphite LEAPR input + NJOY-NCrystal
PG beta4	1.00221	0.99722	Tsl-graphite from β4
PG beta5	1.01440	1.00890	Tsl-graphite from β5
(corrected coh)	1.01141	1.00601	Graphite LEAPR input + NJOY-NCrystal
Free Gas	1.03477	1.02848	No TSL for graphite
CAB	1.00959	1.00423	Independent evaluation based on experimental data.

Benchmark: 1.00000 ± 0.01100

*standard `.70c` ENDF/B-VII.0 ACE files from MCNP5 1.60

†ENDF/B-VIII.0beta5 ACE files from ADVANCE

slide from I. Marquez-Damien

Post beta5 commits

graphite — *see next talks*

^{56}Fe — covariances modified — *see G. Nobre's talk*

^{235}U — corrections to PFNS, PFNS cov.

^{6}Li — version with covariances misplaced in beta4 — *see M. Paris's talk*

Post beta5 decision

light water — *A or B? see next talks*

Big Remaining Data Issues

- **P(nu), will we make it?** — *see formats session*
  It's in the paper, so I guess we have to…
- **Fission Energy Release** — missing from Big 3
- **EPICS2017**
- **graphite** — *see next talks*
- **light water** — *see next talks*

Big Remaining Format Issues

- **P(nu), will we make it?** — *see formats session*
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- **GNDS specifications** — will we make it?

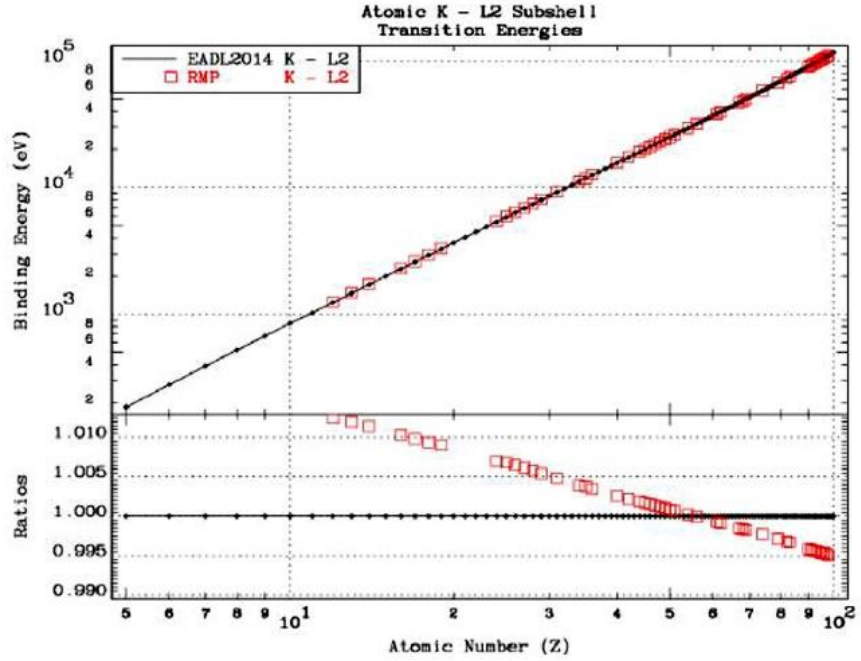
EPICS2017

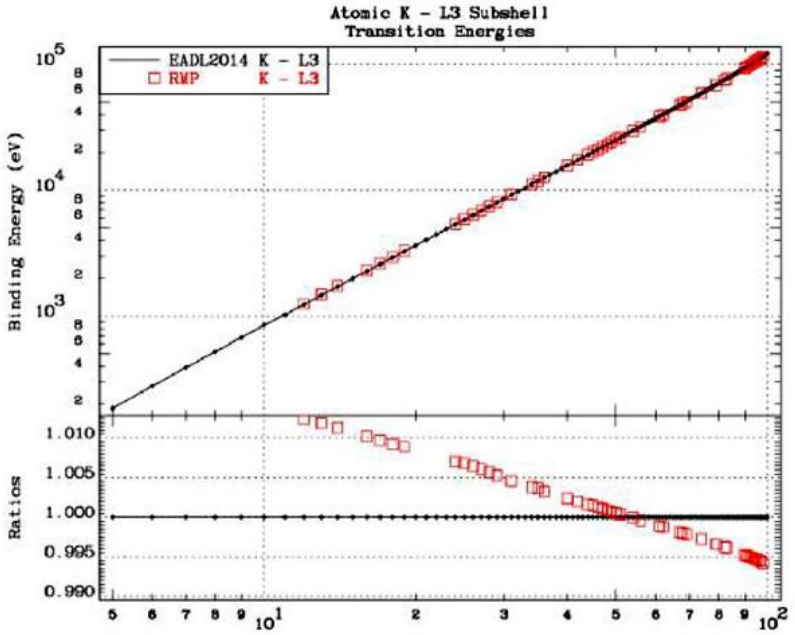
1) **EADL (=atomic_relaxation)** is finished and documented
2) **EPDL (=photo-atomic)** is nearing completion
3) **EEDL (=electron)** Red hopes to complete by years end

In order to insure energy balance, NONE of this can be used until it is all completed.

From IAEA-NDS-224:

EPICS2014 [1] data showed a distinct bias in the atomic binding energies, and therefore transition energies (the transition energy between any two subshells is the difference between the binding energies of the two subshells; this is what an observer would see/ measure as emitted by the atom.


Atomic K – L2 Subshell
Transition Energies
EADL2014 K – L2
RMP K – L2
Binding Energy (eV)
Ratios
Atomic Number (Z)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Transition Energies
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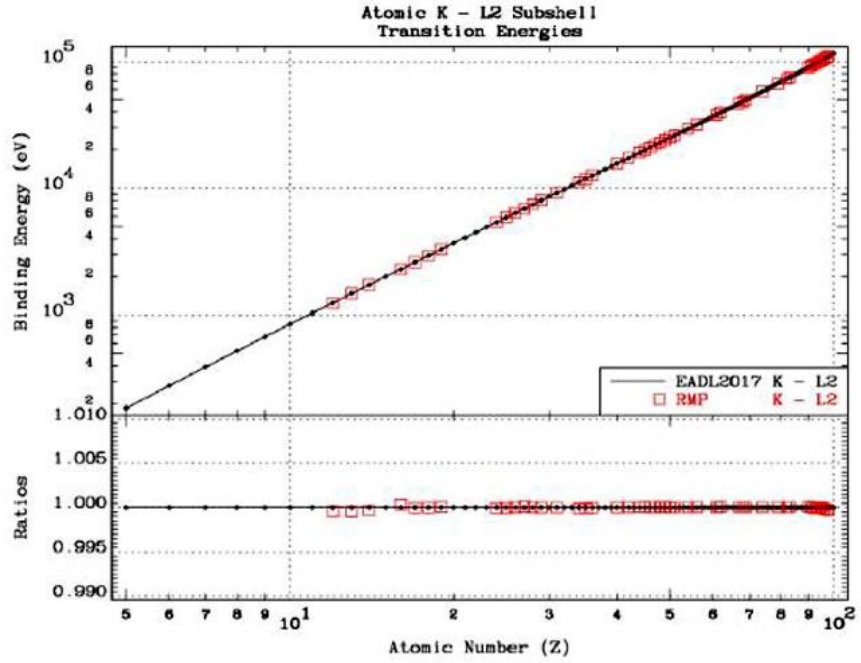
RMP K – L3
Binding Energy (eV)
Ratios


Atomic K – L2 Subshell
Transition Energies
EADL2017 K – L2
RMP K – L2
Binding Energy (eV)
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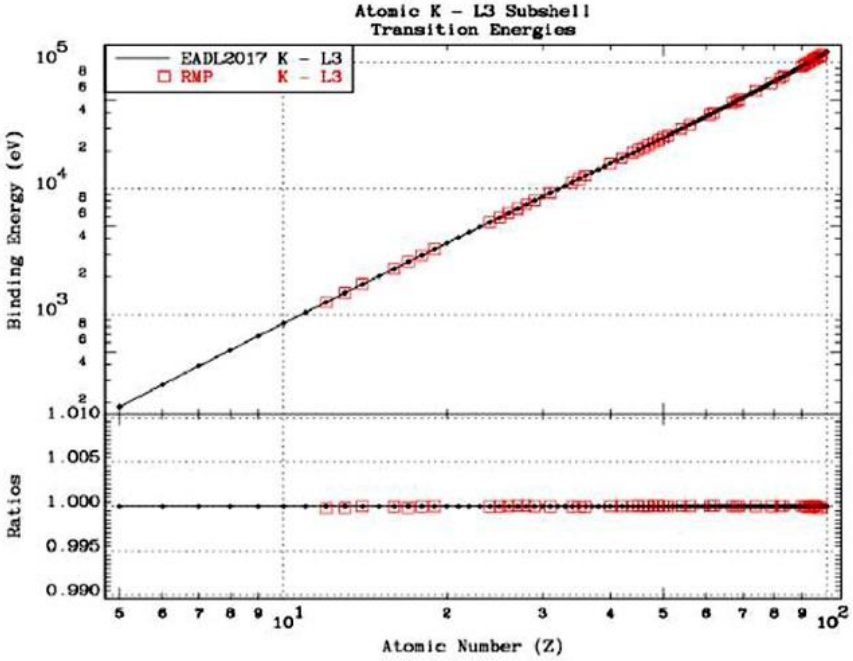
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GND is under active development, stable version due with END/B-VIII.0 release

- **Standard transportable particles:**
  - alphas/
  - deuterons/
  - gammas/
  - helium3s/
  - neutrons/
  - protons/
  - standards/
  - thermal_scatt/
  - tritons/
- **Particle properties:**
  - atomic_relax/
  - decay/
- **Atomic physics:**
  - electrons/
  - photoat/
- **Fission product yields**
  - nfy/
  - sfy/

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- **Particle properties:**
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  - decay/
- **…nysics:**
- **…roduct**
  - nfy/
  - sfy/

FUDGE will be ready, but so far it's not documented

Anything else we should expect?

The ENDF Public Relations Campaign

Big Paper and other papers

Flyer

Talks

- PHYSOR 2018
- 2018 ANS Winter Meeting
- JOWOG
- anything else? volunteers?

Please help: Big paper repository has content (plots & tables) for you

Happy 50 ± 1 Anniversary!*

* CSEWG formed in 1966
  ENDF/B-I released in 1968