BNL contributions to ENDF/B-VIII.0

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BROOKHAVEN NATIONAL LABORATORY
a passion for discovery

U.S. DEPARTMENT OF ENERGY | Office of Science

Release coordination

Fe | TENDL+EMPIRE | Atlas

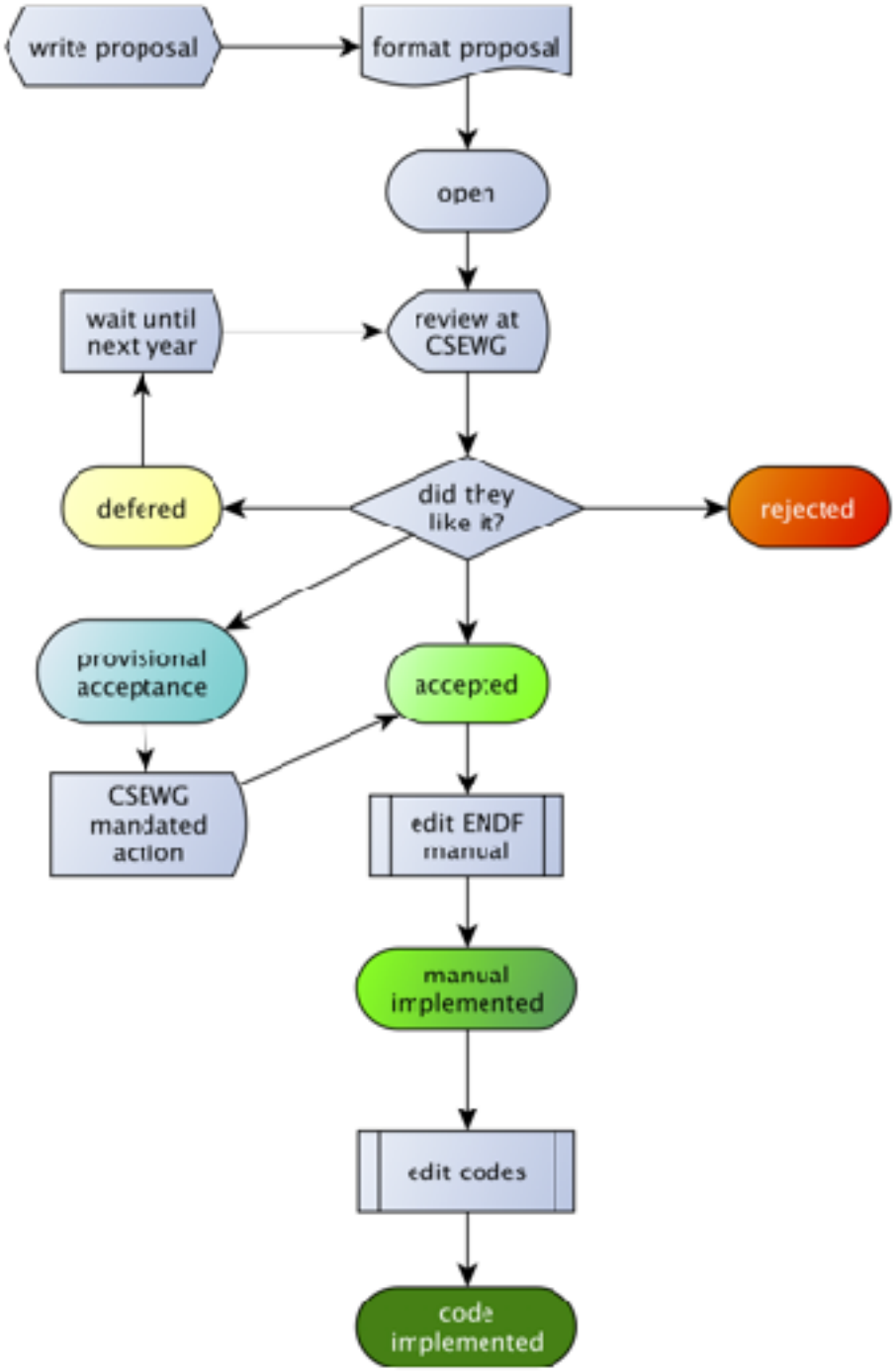
GForge | ADVANCE | Hackathon

ENDF-6 Format Manual | EMPIRE

ENDF-6 Format Manual

Each ENDF/B release is accompanied by an ENDF-6 formats manual revision

We work with the ENDF Formats Committee to shepherd formats from proposals to the manual and checking/processing codes



CSEWG Document ENDF-102
Report BNL-90365-2009 Rev.2
SVN Commit: Revision 192M

ENDF-6 Formats Manual

Data Formats and Procedures for the Evaluated Nuclear Data Files
ENDF/B-VI, ENDF/B-VII and ENDF/B-VIII

Written by the Members of the Cross Sections Evaluation Working Group

Edited by
A. Trkov, M. Herman and D. A. Brown

With contributions from
N. Holden and G. Hedstrom

October 26, 2017

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No major development on EMPIRE in FY17 beyond bug fixes needed to get evaluation work done

ENDF-6 Format Manual

EMPIRE

Discussed by Tim Johnson

GForge

ENDF-6 Format Manual

EMPIRE

GForge

ADVANCE

ENDF-6 Format Manual

EMPIRE

ENDF/B Quality Assurance

Pen-n-paper "Days of yore" (pre-2011)

ENDF/B Evaluation Review

Sample PHASE I review packet cover page (June 2000)

Automated with ADVANCE (2011-present)

http://www.nndc.bnl.gov/endf/b7.dev/qa/index.html

Where to find the link to ADVANCE

www.nndc.bnl.gov

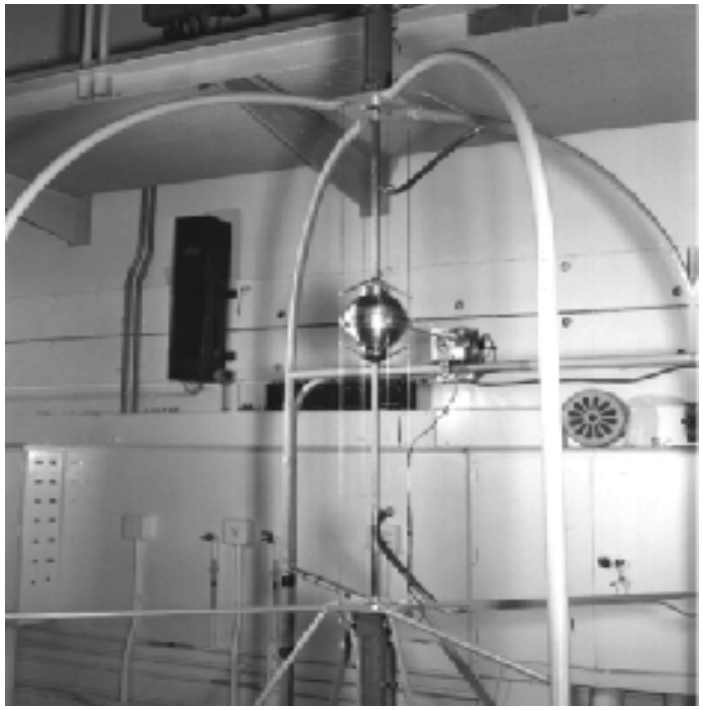
Reactions tab

The link

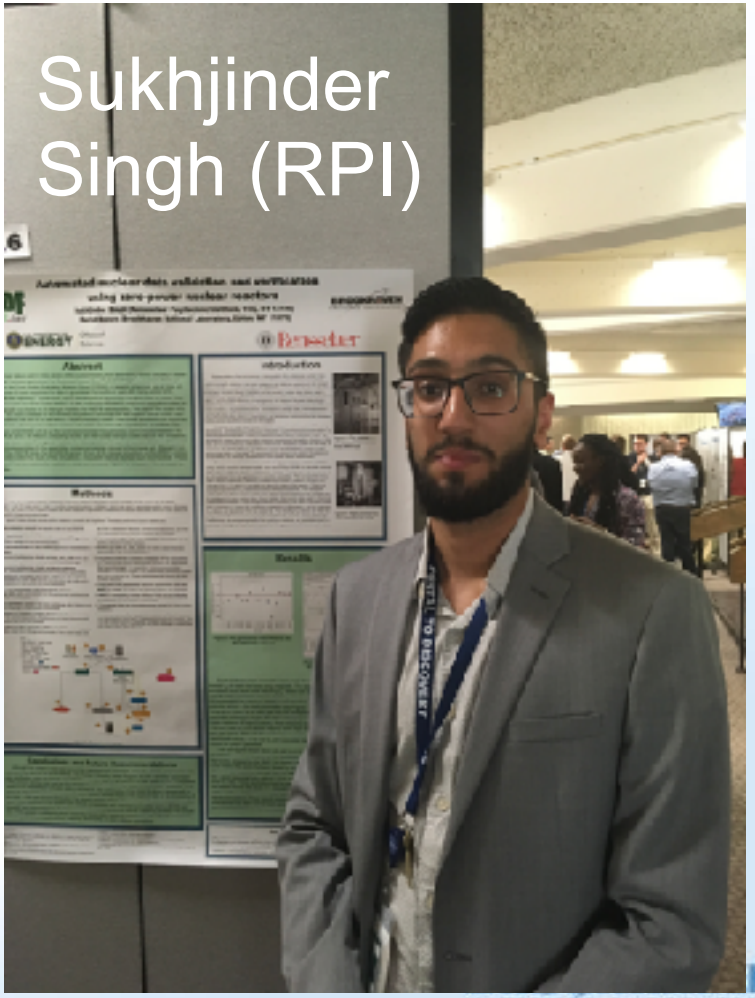
ADVANCE quality assurance system for ENDF

- On every commit of every evaluation automatically:
  - Run it through a battery of tests, including customer codes
  - Generate comparison plots
  - Generate HTML report
- New in FY17:
  - Update Fudge-4.2.1 add PREPRO/ GROUPIE
  - Aesthetic improvements (AJAX & MathJax)
  - Full library ACE file tarballs
  - Per-isotope error reports
  - Covariance and ACE overview
  - Rewrote INTER using FUDGE

SULI student progress toward adding automated benchmarking

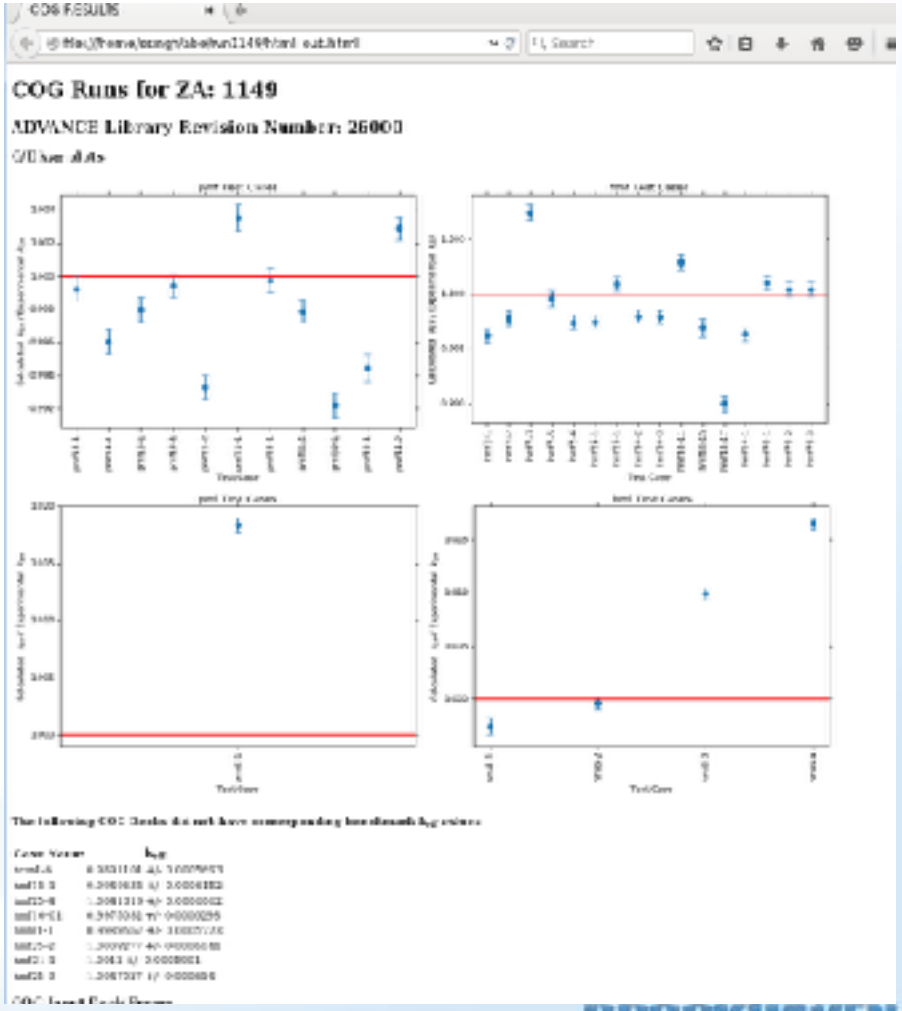


JEZEBEL—A bare sphere of Plutonium-239 Metal (PMF001)



SULI student progress toward adding automated benchmarking

- COG “wrapped” by Python script
  - Problem setup and teardown
  - Input file generation
  - Output file parsing
- Automatic COG library setup
- Interacts with BNL batch queue system
- Builds HTML report upon completion
- Need to integrate into main ADVANCE



GForge | ADVANCE | **Hackathon**

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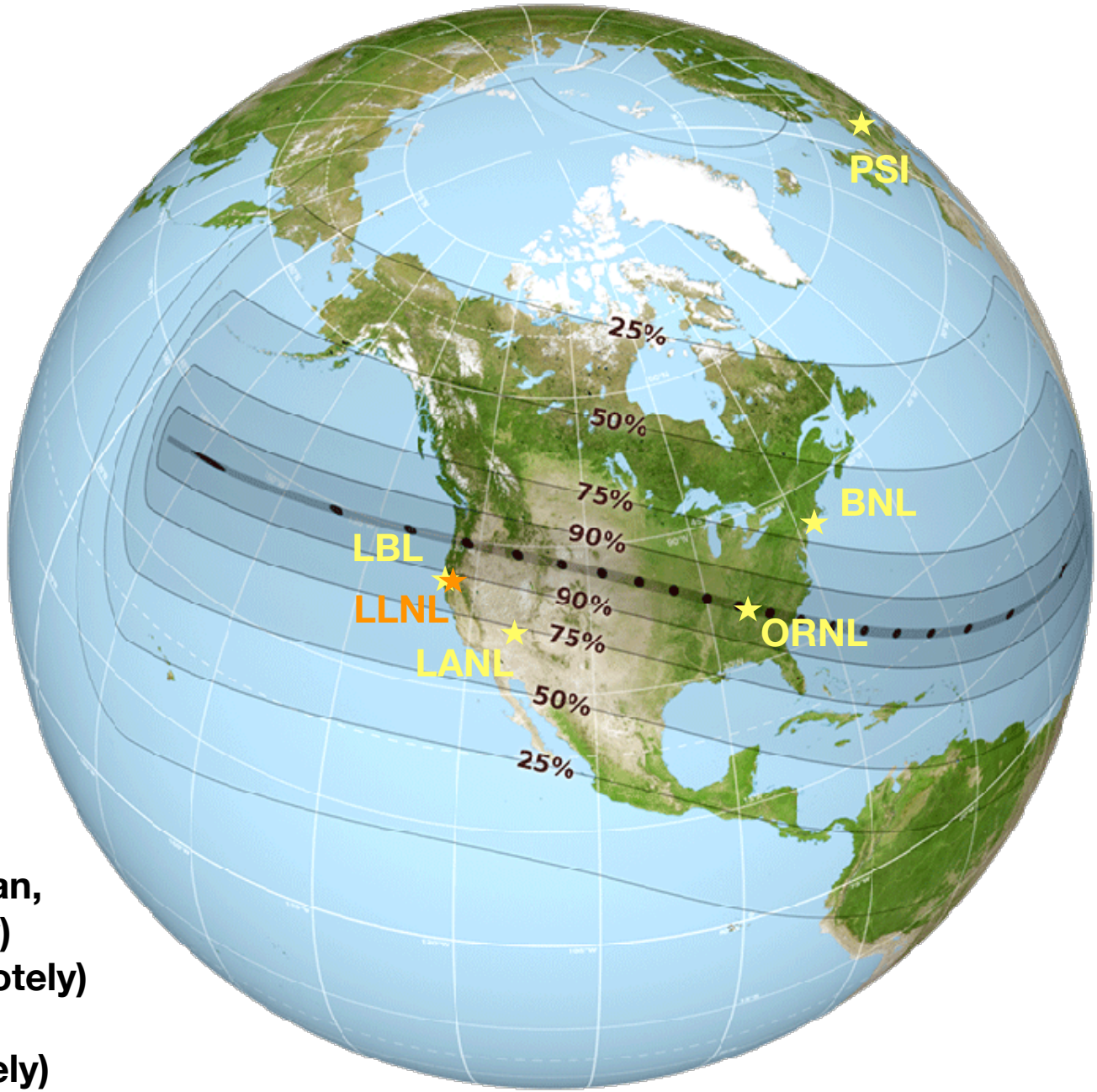
Held at LLNL, 79% of totality



ENDF hackers:

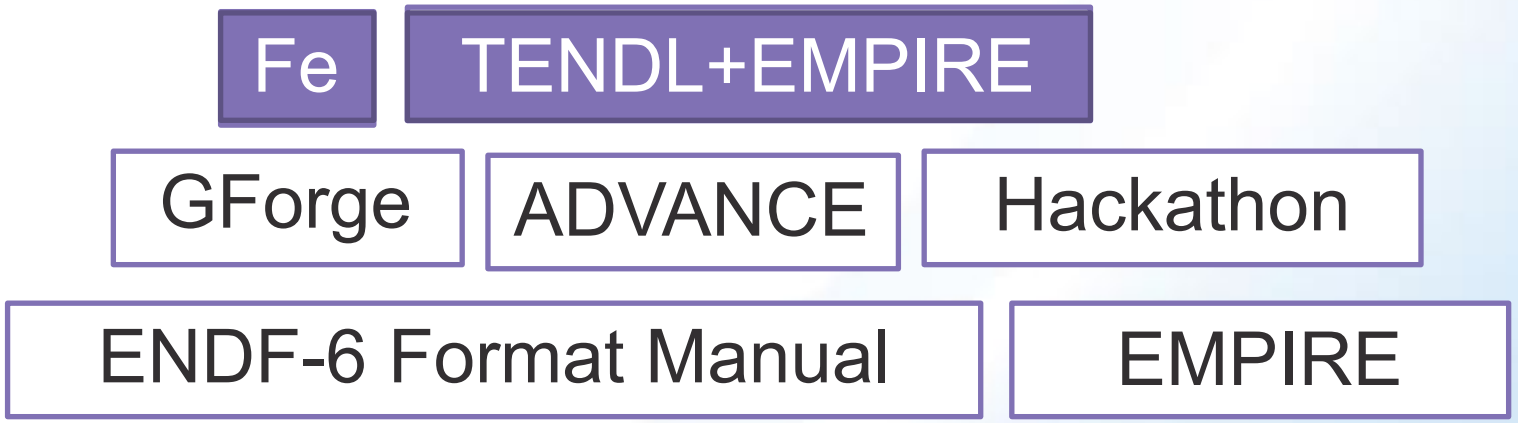
LLNL: Ian, Caleb, Sofia
LBL: Amanda
LANL: Toshihiko, Morgan, Denise (remotely)
ORNL: Doro, Vlad (remotely)
BNL: Dave
PSI: Dmitri (very remotely)

Committer	No. Commits	No. Files Changed	Focus
Mattoon	20	154	Isomers
Thompson	17	88	Charged particles
Conlin	1	1	NJOY formatting
Brown	45	149	New files (esp. TENDL+EMPIRE)
Kawano	7	12	Elastic cross sections >0
Quaglioni	1	6	Photonuclear
Lewis	36	342	Header issues
Wiarda	11	31	Covariance
White	0	0	Fission energy release
Neudecker	0	0	PFNS
Sobes	0	0	Covariance
Rochman	0	0	Platinum

“Alternative Metrics”

- Checking and processing codes don’t have uniform criteria for errors (either what triggers then or what the message is), so meaningful regressions impossible…
- Banned from GForge twice!
- Overloaded ADVANCE, took ~ 1 week to catch up
- Page count in neutron release notes dropped ~15% while sublibrary size grew ~25%

See Gustavo Nobre's talk



Atlas of Neutron Resonances

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Elsevier
Amsterdam
The Netherlands

Submitted to Elsevier in July

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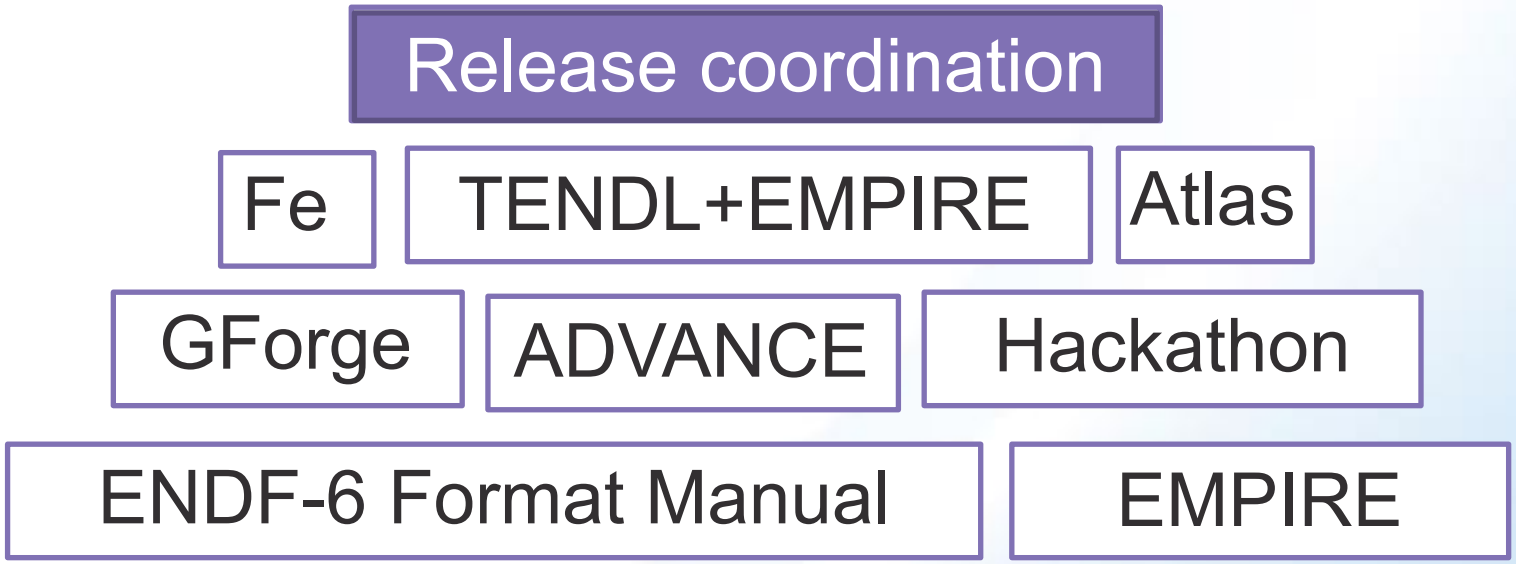
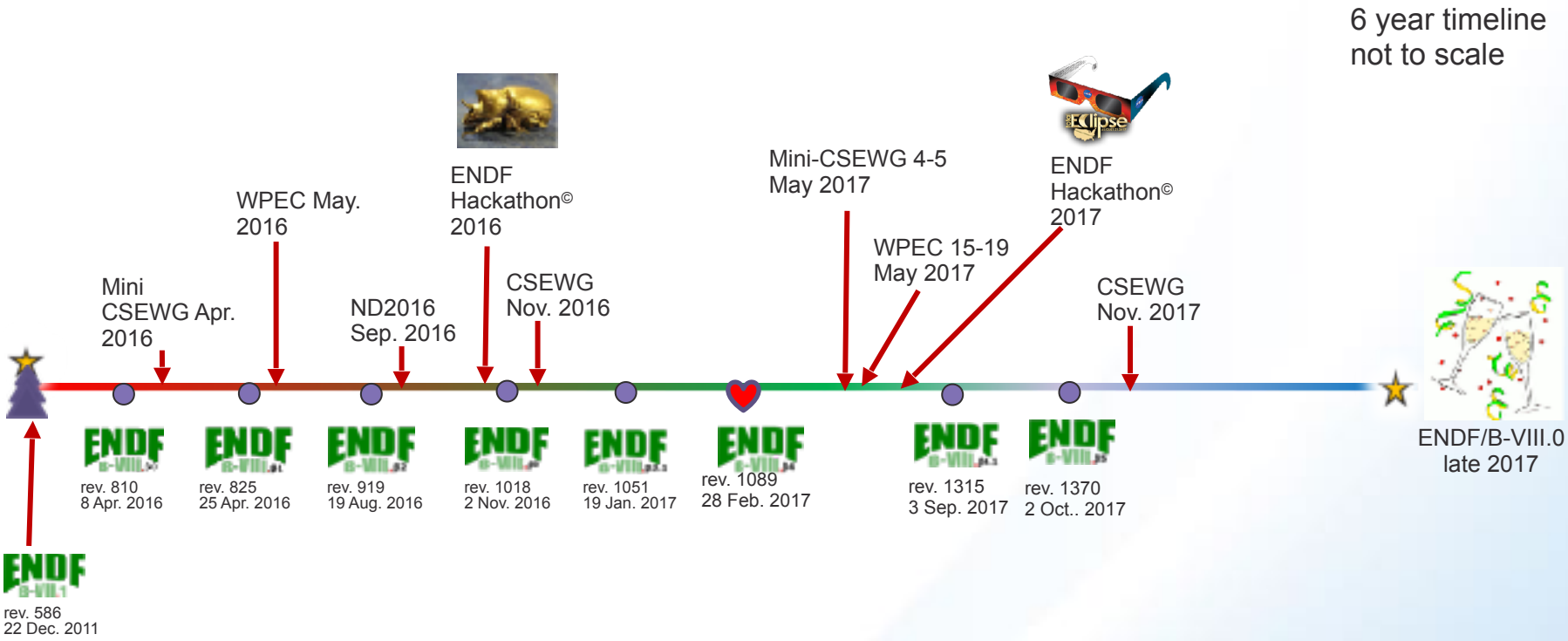
Discussed by D. Brown in AM session



ENDF/B-VIII on track for late FY17



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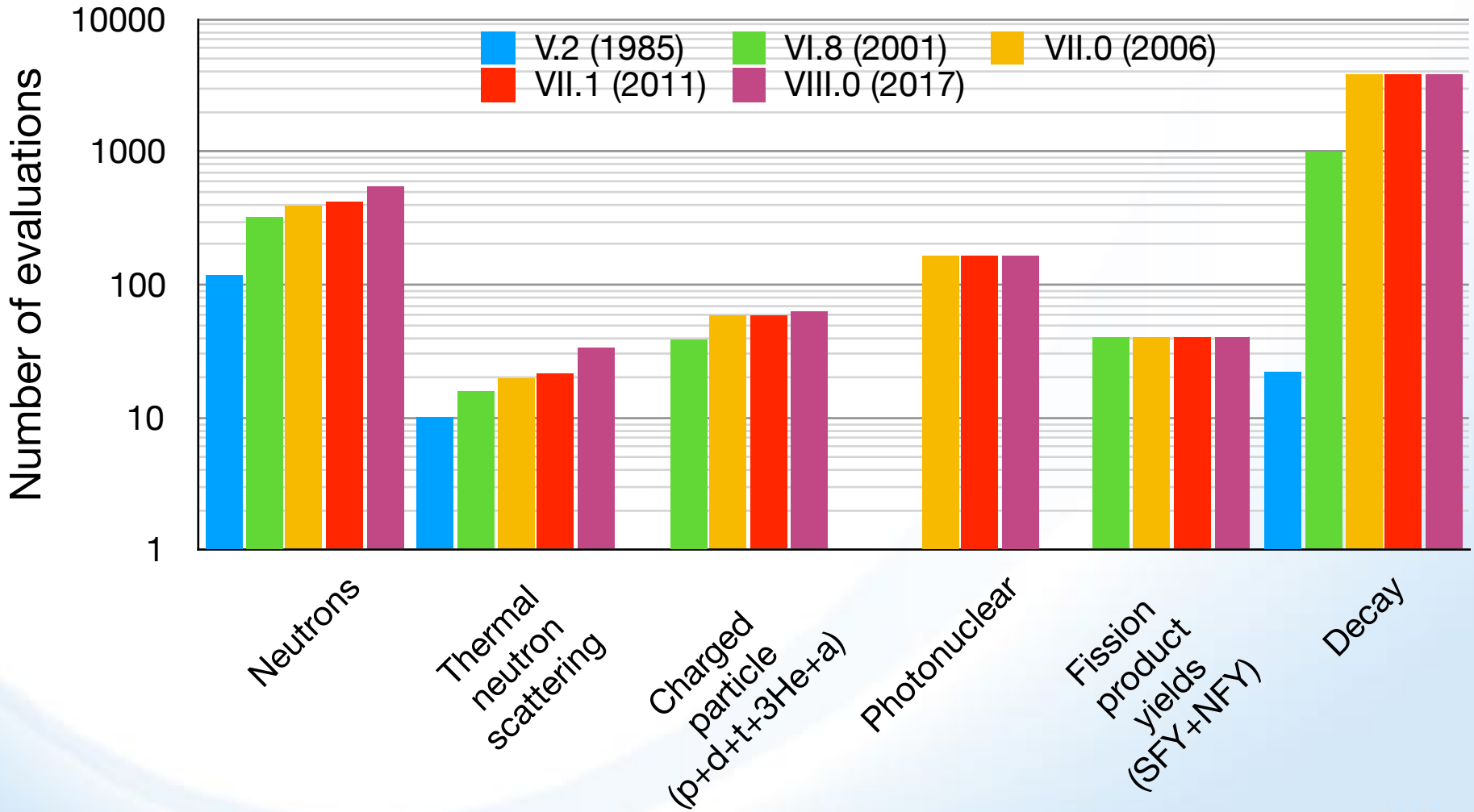
ENDF/B-VIII.0 is biggest library yet