National Nuclear Data Center

Brookhaven National Laboratory

U.S. DEPARTMENT OF ENERGY

ENDF Library Update

Gustavo Nobre

ENDF library manager

National Nuclear Data Center

Brookhaven National Laboratory

@BrookhavenLab

2024 CSEWG Meeting

BNL - November 5-7, 2024

Outline

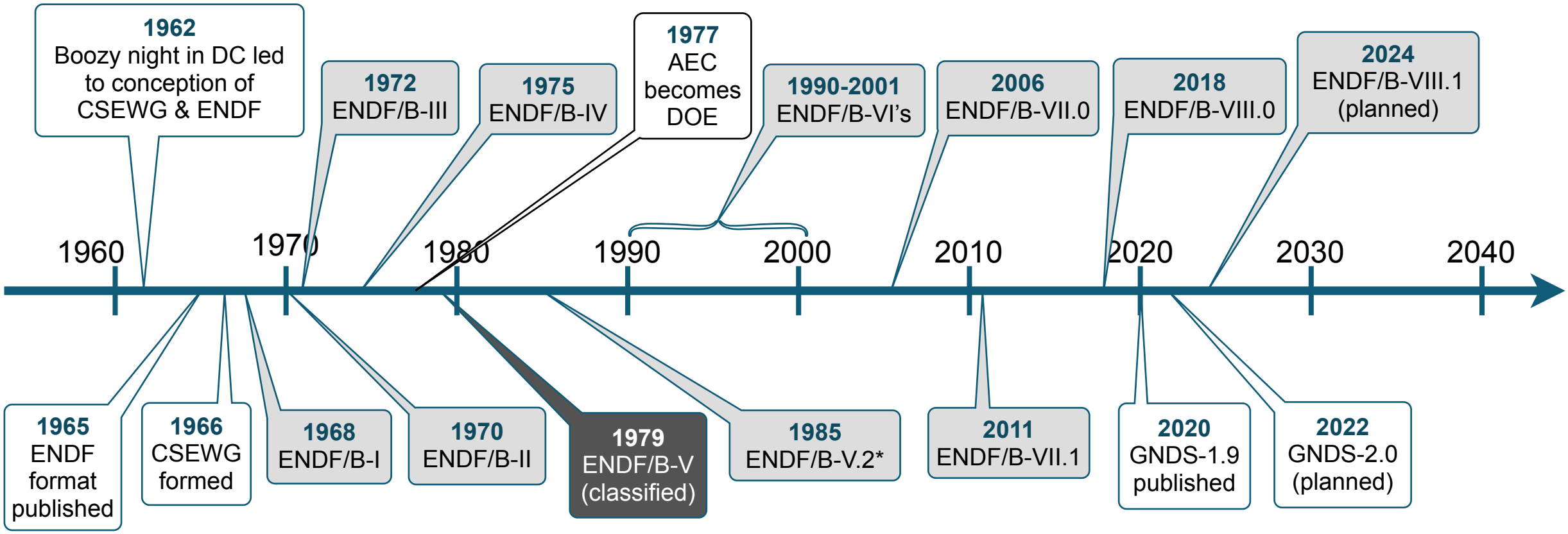
- Status of ENDF/B-VIII.1
- ENDF website
- ENDF/B-VIII.1 Big Paper
- ENDF/B-IX.0-Beta1

ENDF/B-VIII.1 release status

ENDF/B-VIII.1 release status

ENDF/B-VIII.1 was released on August 30th, 2024!

ENDF Timeline



* everybody's favorite release

Timeline courtesy of Dave Brown

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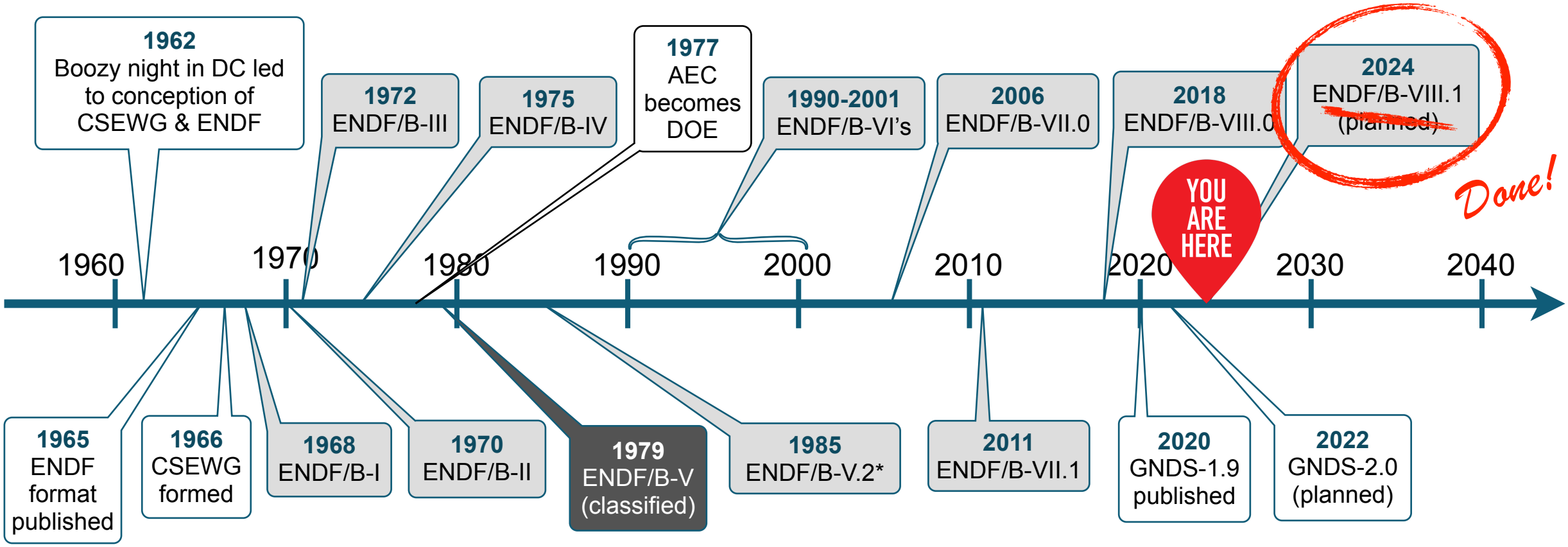

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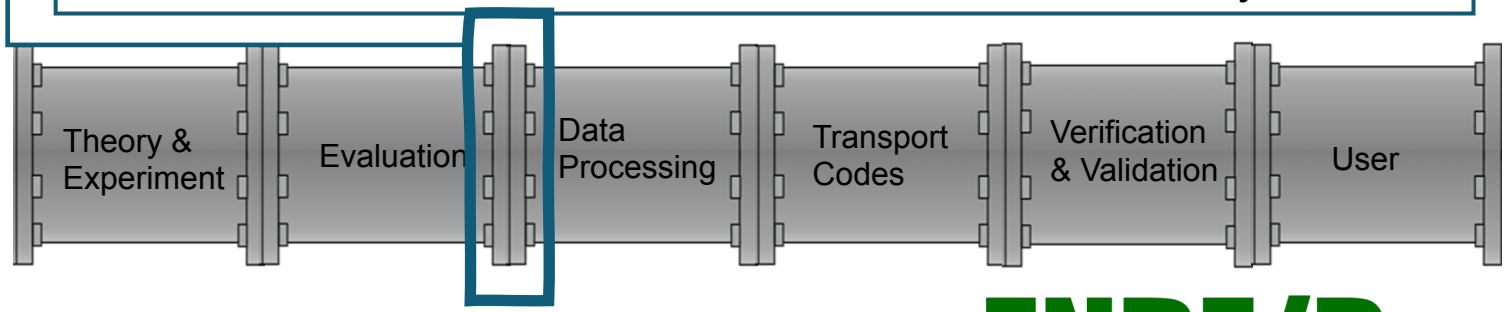
ENDF/B releases are a key interface in the improvement of the nuclear data that reaches the users' community!

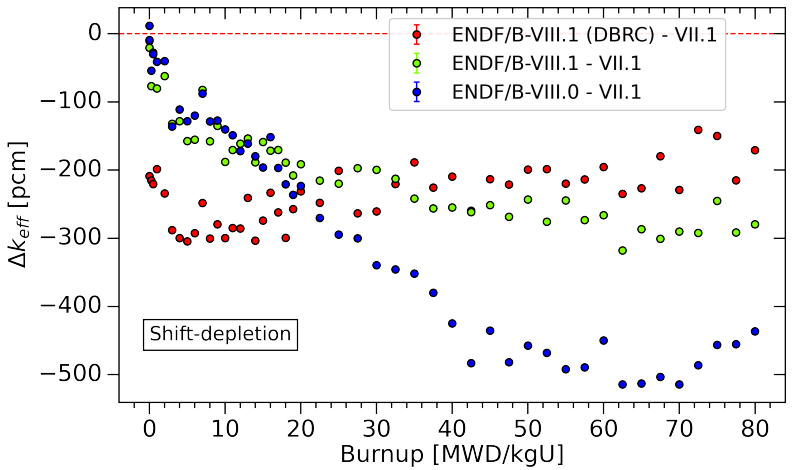


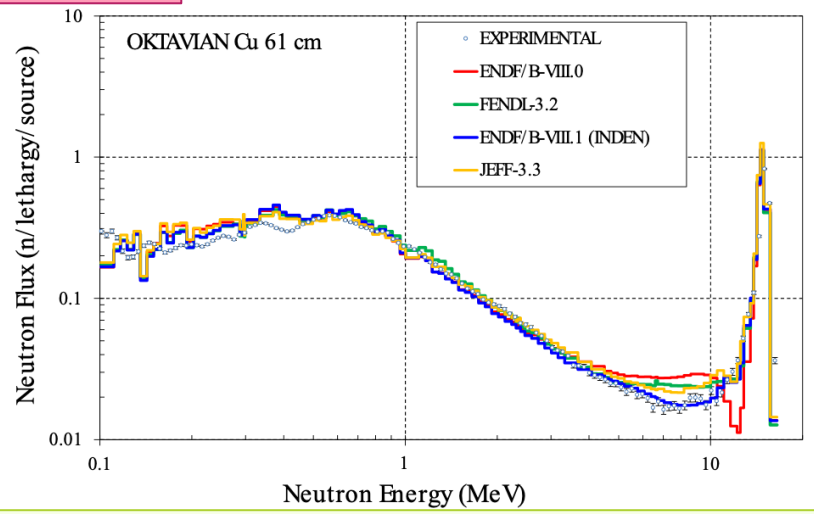
The previous release (VIII.0) was great, but…

- Underpredicted depletion at high burnup
- Had deficiencies in leakage benchmarks
- Many other contributions since then

ENDF/B VIII.1

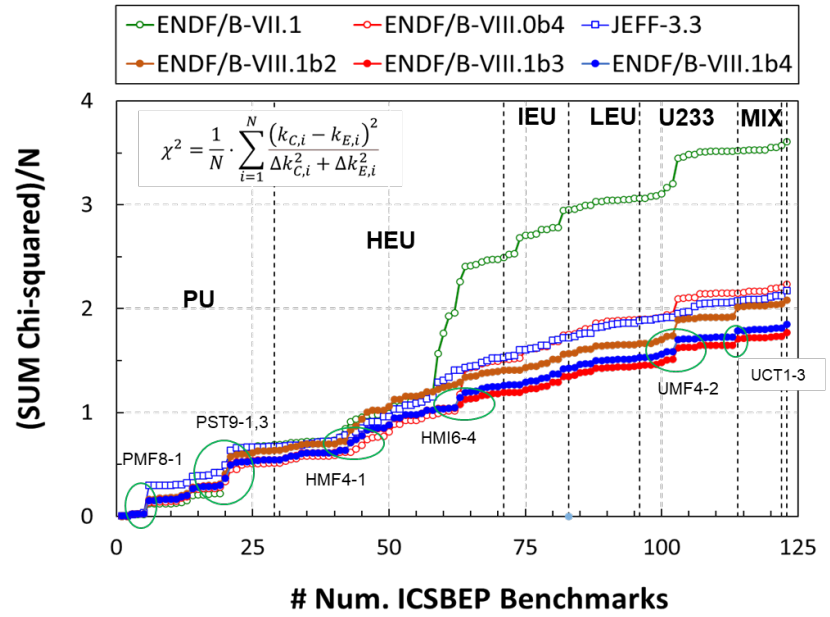
was released Aug 30, 2024!





Mosteller's Suite - 123

Case HMF4.1: Δkeff EXP=30 pcm



VIII.1 dramatically improves depletion performance,…

…performs much better in leakage and shielding experiments due to updates in Cu, Fe, Cr, Pb,…

…all while further improving the performance in criticality benchmarks, with updates to ^{239}Pu, ^{235,238}U, et al.!!

Feedback on VIII.1

ENDF/B VIII.1

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  - Noticed the need to direct users to the right versions of processing codes

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  - A “procedure mishap” led to an inadvertent replacement of URR covariances by ones extended from fast region
    - This happened on VIII.1-Beta4 and went unnoticed until after VIII.1 final release

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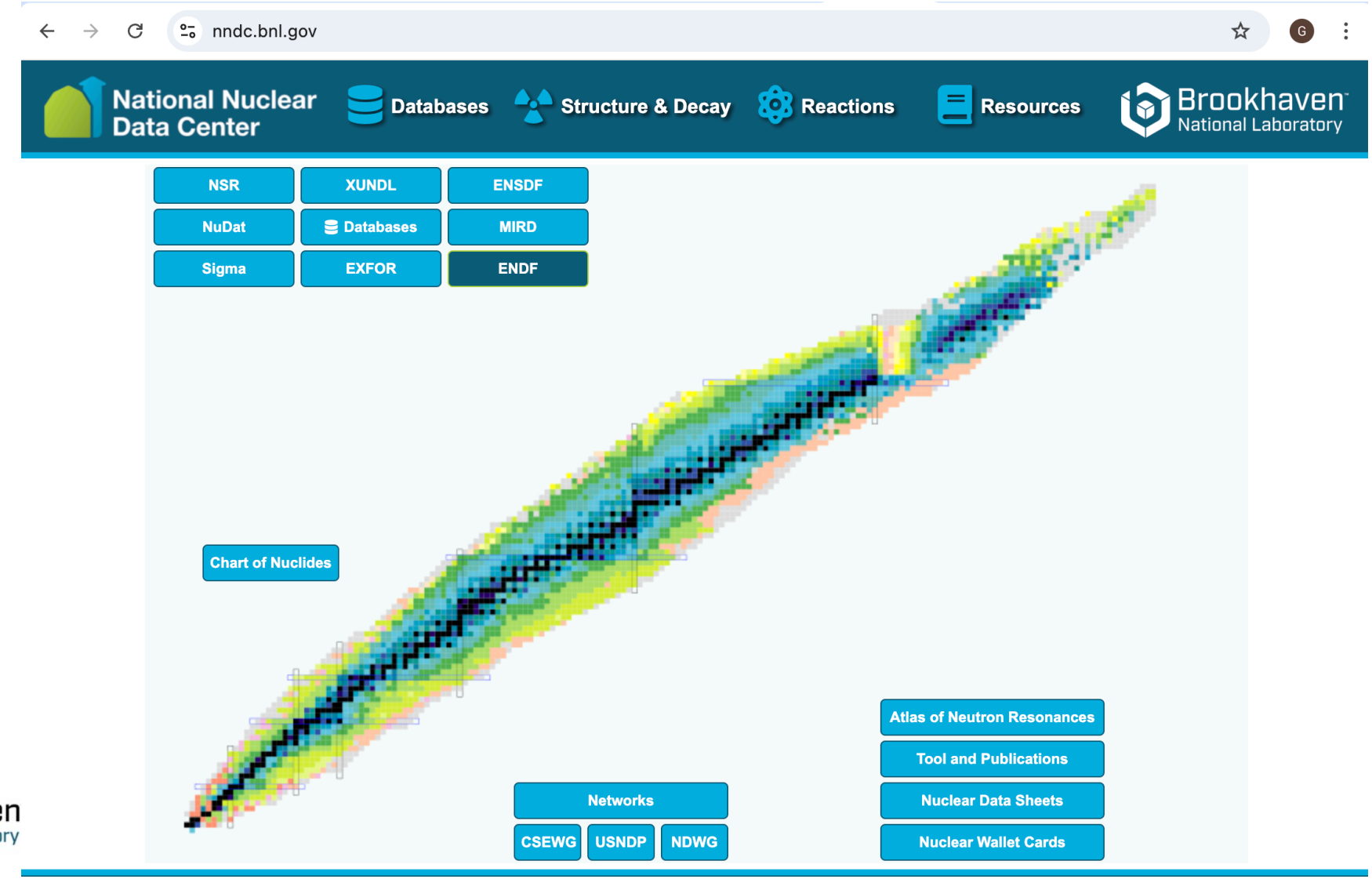
New ENDF website - Donnie Mason



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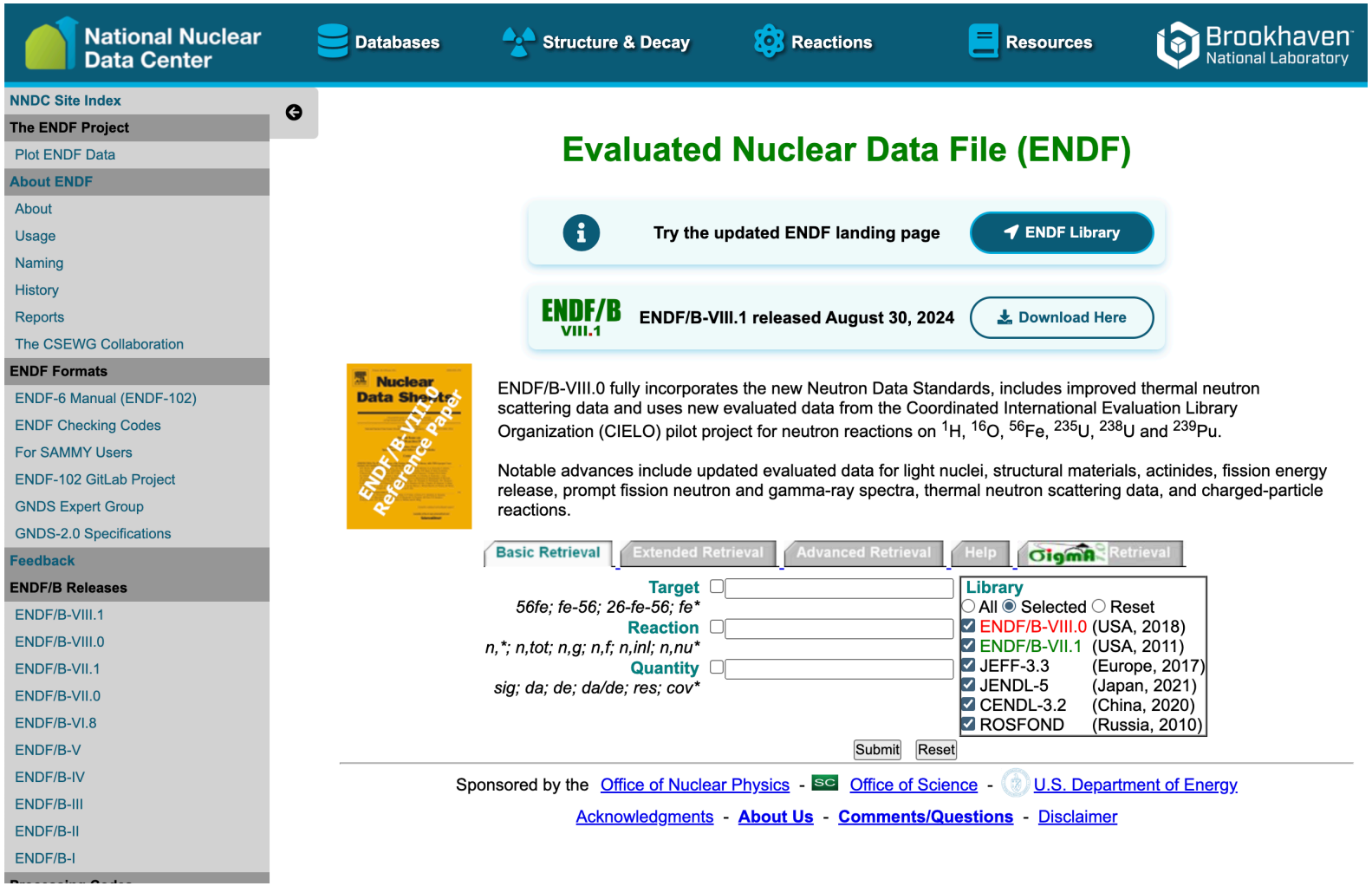

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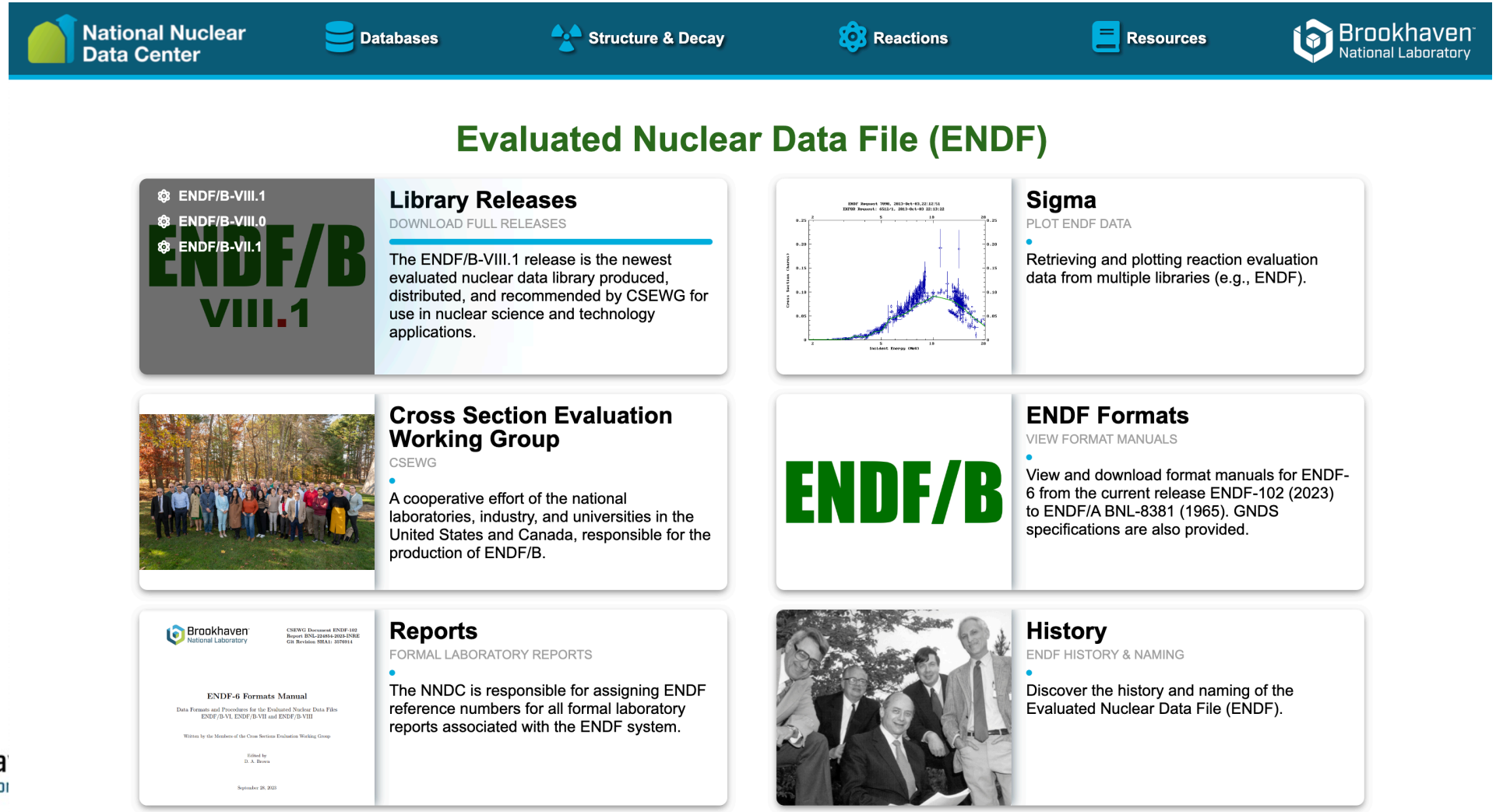

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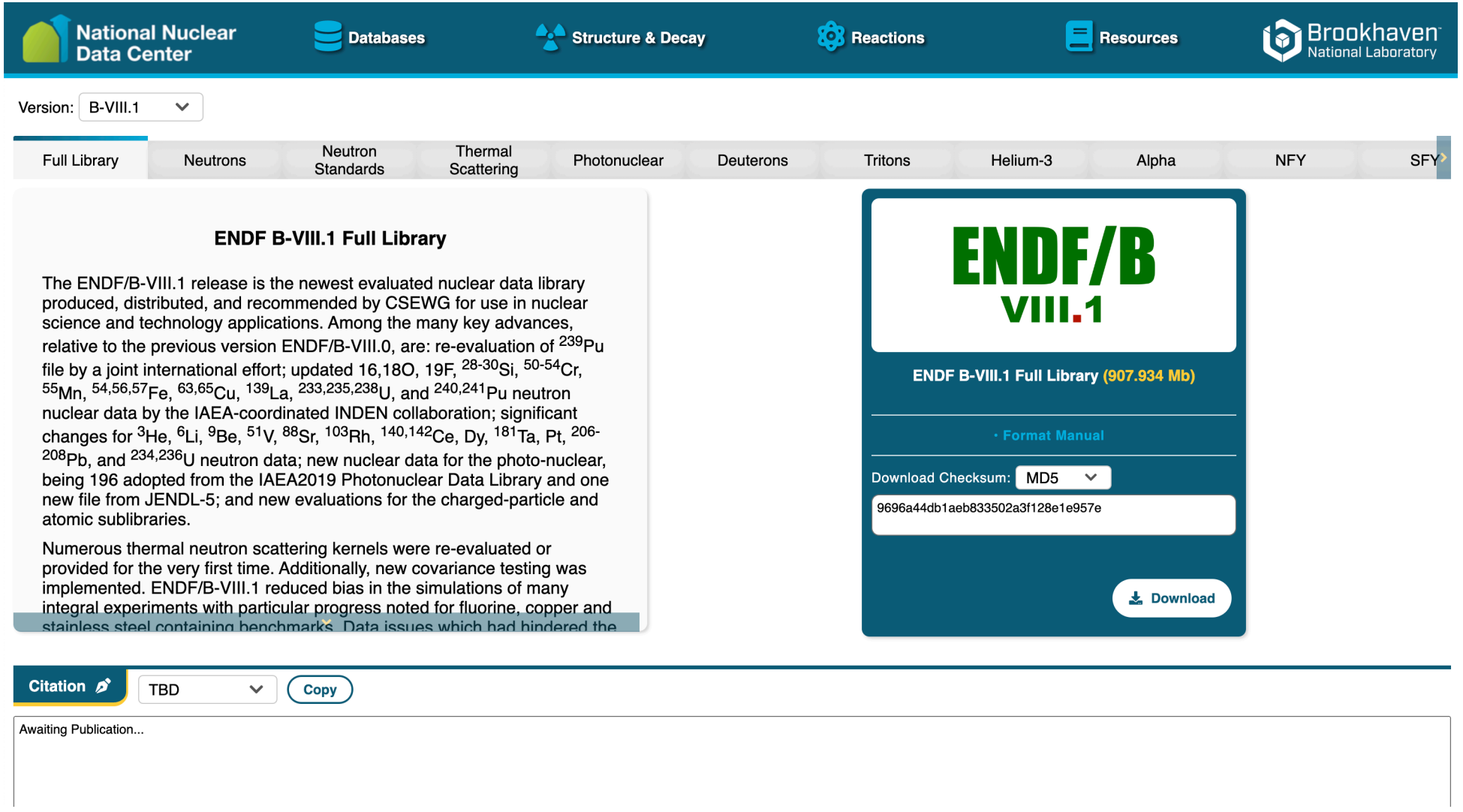

New ENDF website - Donnie Mason

Library Downloads | Download Selected

File	Size
Electron Reaction Sublibrary	7.544 Mb
Photonuclear Sublibrary	141.016 Mb
Helium-3 Reaction Sublibrary	203 KB
Neutron Reaction Sublibrary	343.487 Mb
Neutron Induced Fission Product Yields Sublibrary	1.502 Mb
Photoatomic Reaction Sublibrary	33.635 Mb
Proton Reaction Sublibrary	12.473 Mb
Spontaneous Fission Product Yields Reaction Sublibrary	277 KB
Neutron Standards Sublibrary	19.52 Mb
Thermal Neutron Scattering Sublibrary	480.459 Mb
Triton Reaction Sublibrary	186 KB

Collaboration Summary

Data Manager	National Nuclear Data Center (NNDC)
Data Curator	Gustavo Nobre
Contact Person	Gustavo Nobre
Project Leader	David Brown
Hosting Institution	Brookhaven National Laboratory (BNL)
Producer	Cross Section Evaluation Working Group (CSEWG)

Deposition Summary

Depositor	Gustavo Nobre
Contact	gnobre@bnl.gov
Deposition Date	10/21/2024
Last Modified	10/21/2024
DOI	TBD

Resources

Format Manual | Summary | GNDS

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Format Manual | Summary | GNDS

ENDF/B VIII.1

ENDF B-VIII.1 Full Library (907.934 Mb)

• Format Manual

Download Checksum: MD5

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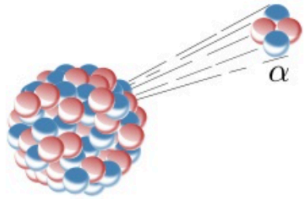
Download



Alpha Reaction Sublibrary (181 KB)

• Release Notes • Changelog • Material List

Download Checksum: MD5

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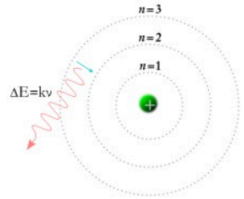

Atomic Relaxation Reaction Sublibrary (1.397 Mb)

• Release Notes • Changelog • Material List

Download Checksum: MD5

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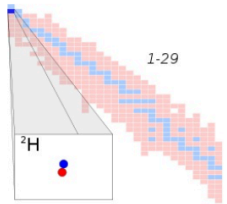
Download

Decay Reaction Sublibrary (10.358 KB)

• Release Notes • Changelog • Material List



Deuteron Reaction Sublibrary (208 KB)

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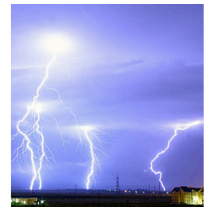

Electron Reaction Sublibrary (7.544 Mb)

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ENDF/B-VIII.1 Big Paper

Big Paper - ~~GREAT~~ Good news!

ENDF/B-VIII.1: Updated Nuclear Reaction Data Library for Science and Applications

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[31] *University of Surrey, Guildford, Surrey, GU2 7XH, UK*

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Big Paper - ~~GREAT~~ Good news!

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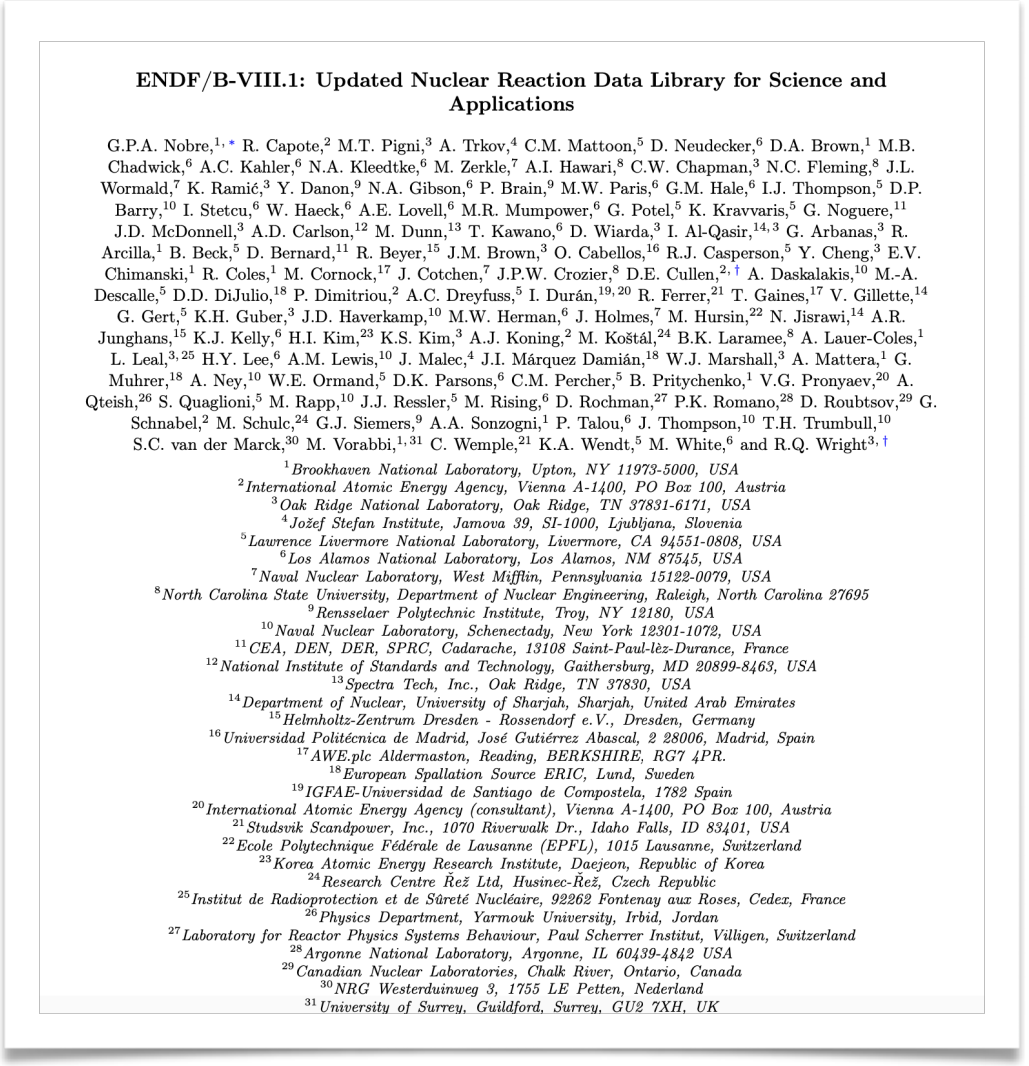
- Secured OPEN ACCESS!



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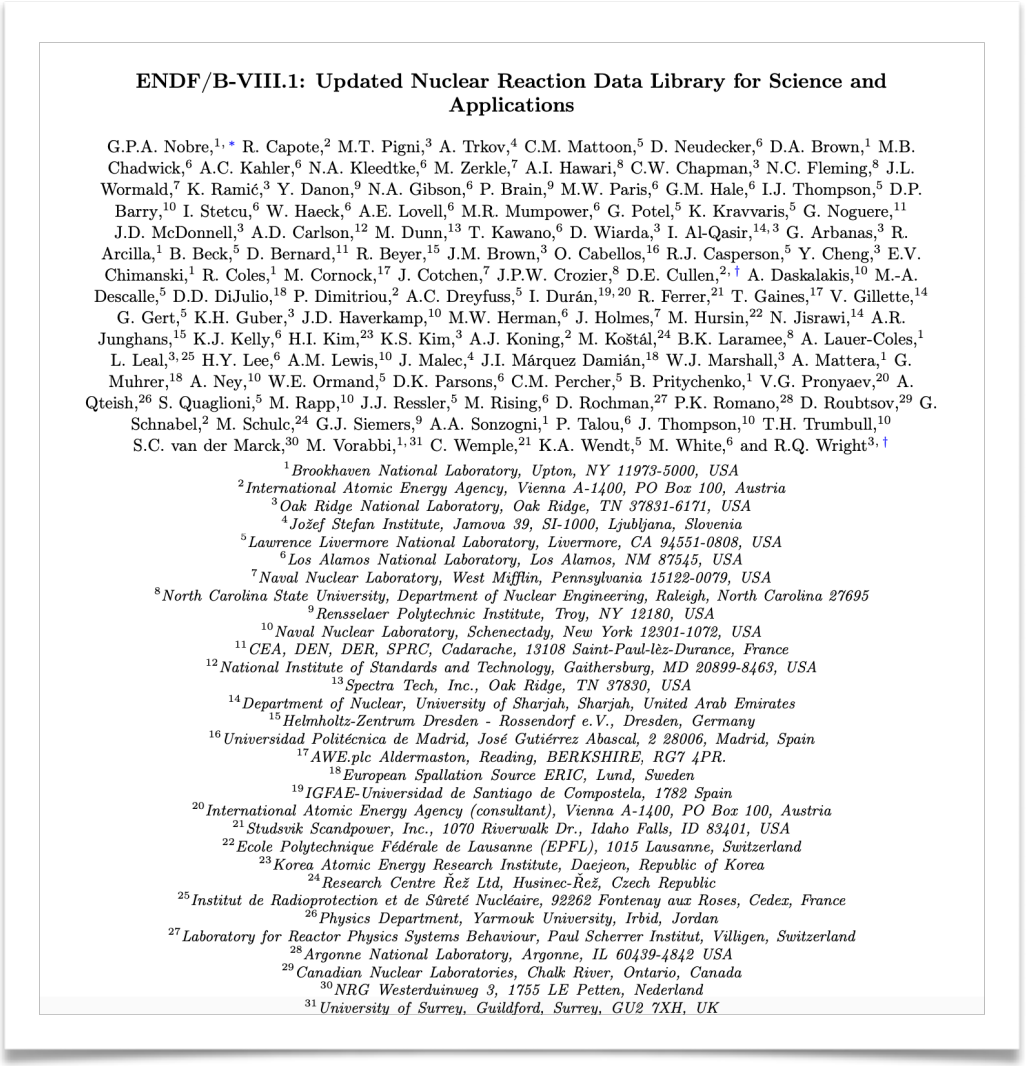

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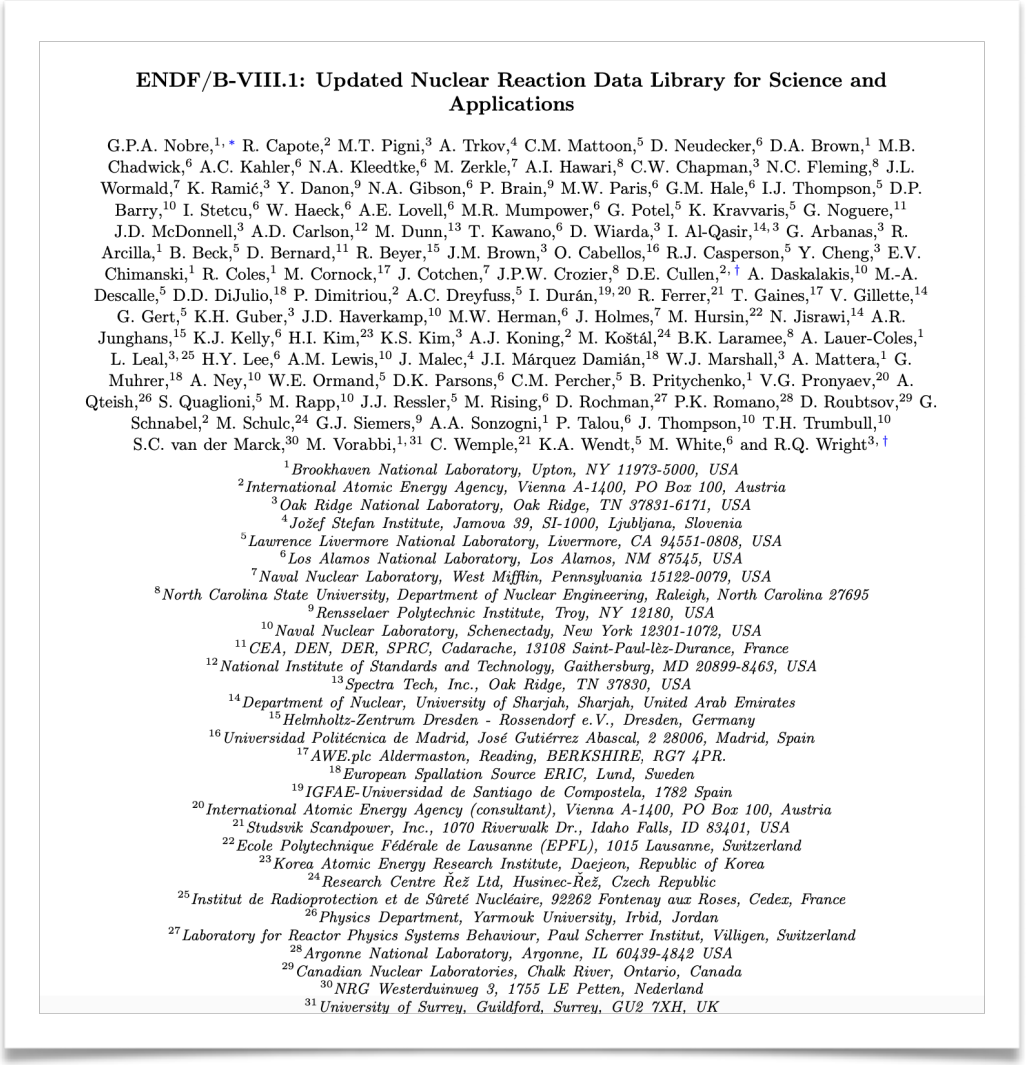

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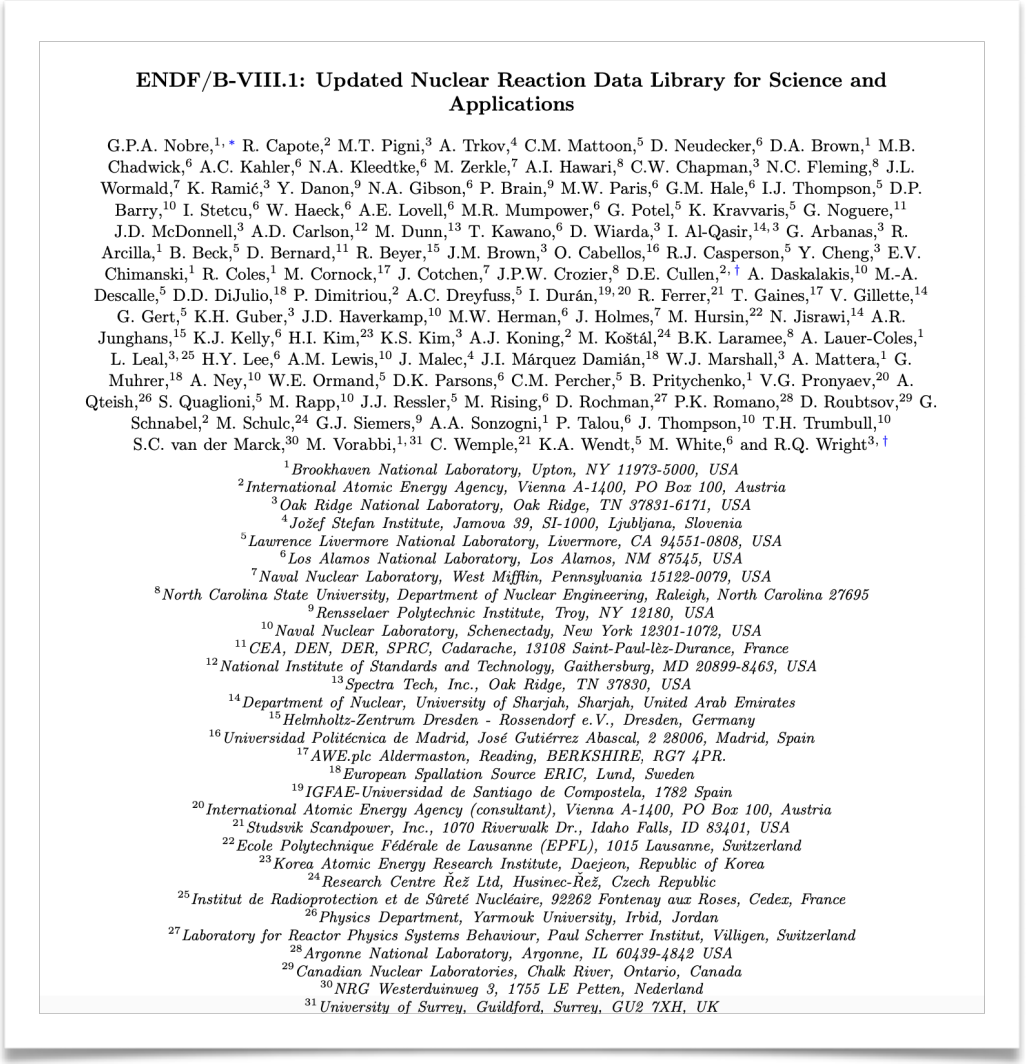
    - Select referees and submit manuscript to review while details like final numbers on tables and plots were being finalized
    - Seemed like a good arrangement, since Big Paper draws so many citations



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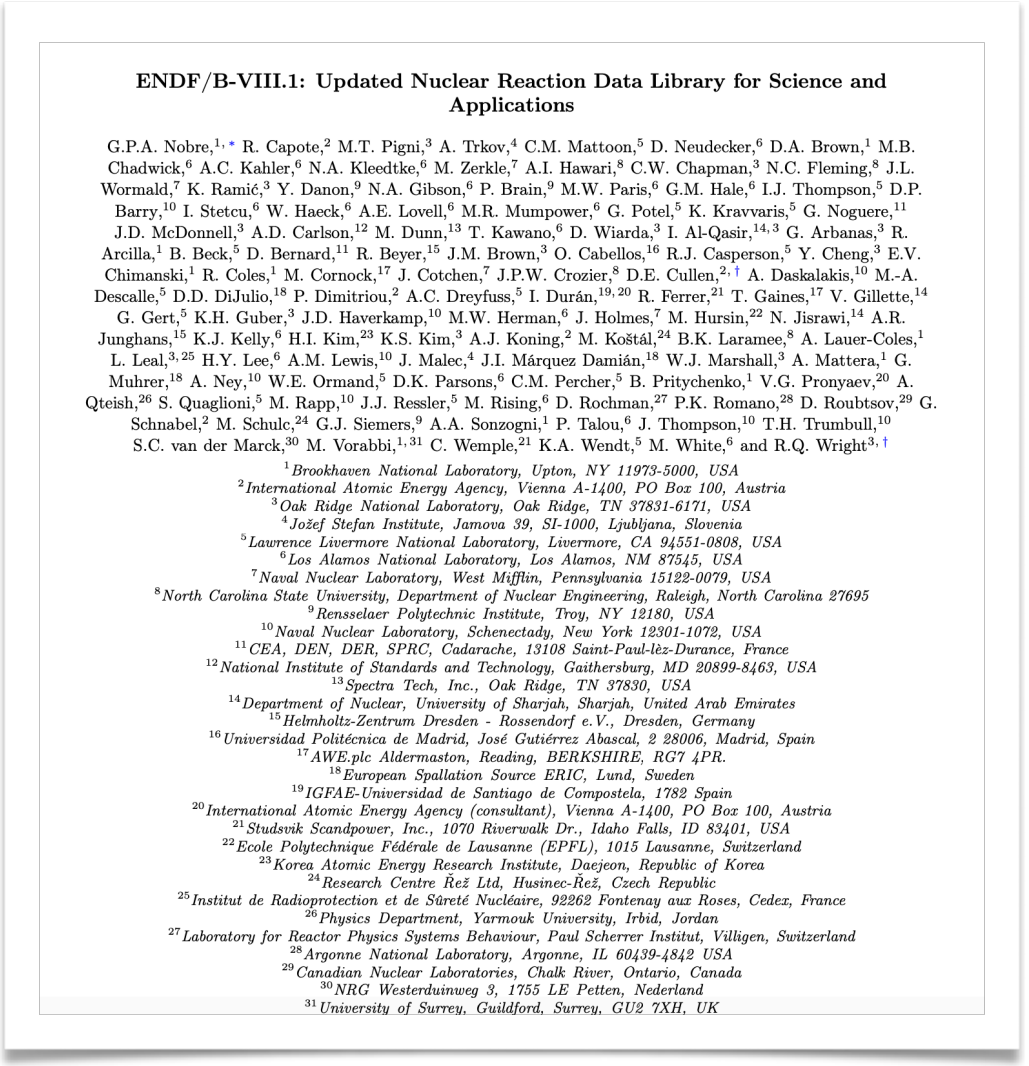

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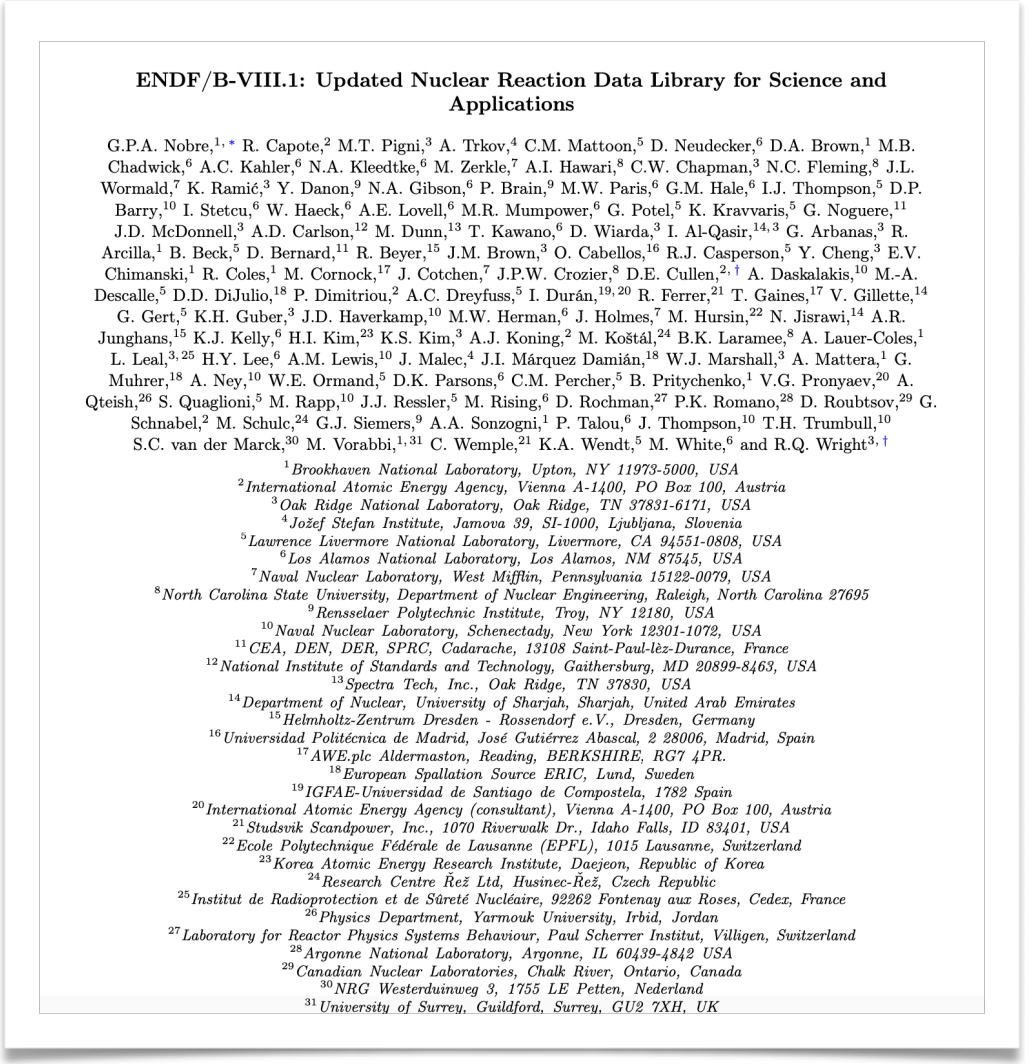
  - Journal concerned about precedence setting for non-Big-Paper submissions
  - Appearance of "nepotism" by giving special treatment to a manuscript authored by many NNDC'ers
- **What can we do?**
  - LANL is finishing the complete validation table (main paper and supplemental materials)
  - I am going over the paper, especially validation section, to see if there are plots/table done with VIII.1-BetaX instead of final VIII.1 version
  - Will contact authors to update this. If you already know you need to do an update like that, do so, don't wait for my email!



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ENDF/B-IX.0-Beta1

2025 Hackathon…?

- There are many remaining bugs in the library
- With the push for the final release, Hackathon was low-priority
- This is a good time to do it:
  - After VIII.1 and before IX-Beta1
- Who's organizing it?
  - There have been indications of volunteers
  - Is the volunteer still volunteering?
  - We need to confirm organizer, ASAP
- When? February? April?

Evaluations already submitted

Neutrons:

- ^{35}Cl (LANL/Terrapower)
- ^{181}Ta (URR covariance fix)
- ^{238}U (LANL PFNS)
- GRIN (^{9}Be, ^{12}C, ^{14,15}N, ^{17}O, ^{22,23}Na, ^{24,25,26}Mg, ^{27}Al, ^{28,29,30,31,32}Si, ^{32}S, ^{55}Mn, ^{63,65}Cu

TSL:

- Polyethylene extended temperatures (NCSU)
- W, V, Pb, Ni, Mo, Cu (ORNL)

Photonuclear:

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Photonuclear:

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Expected/planned submissions (That I know of…)

Neutrons:

- ^{95}Mo, Gd (ORNL)
- Zr (RPI/ORNL/BNL…)

Deuterons:

- D+T (LANL/LLNL)

Standards:

- ^{252}Cf sf

Alphas:

- (a,n) from JENDL (M. Pigni)

FPY

Decay

Timeline of ENDF/B-IX.0-Beta1

- Feedback from Validation community:
  - Predictable timeline
  - Ample time for testing
- My considerations, up for debate:
  - I could push for a quick turnaround, but…
  - Better wait for Hackathon
  - Now that we won't need to fast-track ^{181}Ta, we can bring all submissions from **`saved_for_after_VIII.1`** branch and start doing all reviews.
  - If ENDF/B-IX-Beta1 is released in the first semester of 2025, that should give comfortable time for tests to be presented at 2025 CSEWG in November

There’s a celebratory surprise awaiting at the morning break!

Acknowledgements

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