



2025 updates on codes for ENSDF evaluation

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2025 USNDP annual meeting, 28-31 October 2025

@ZOOM, BNL



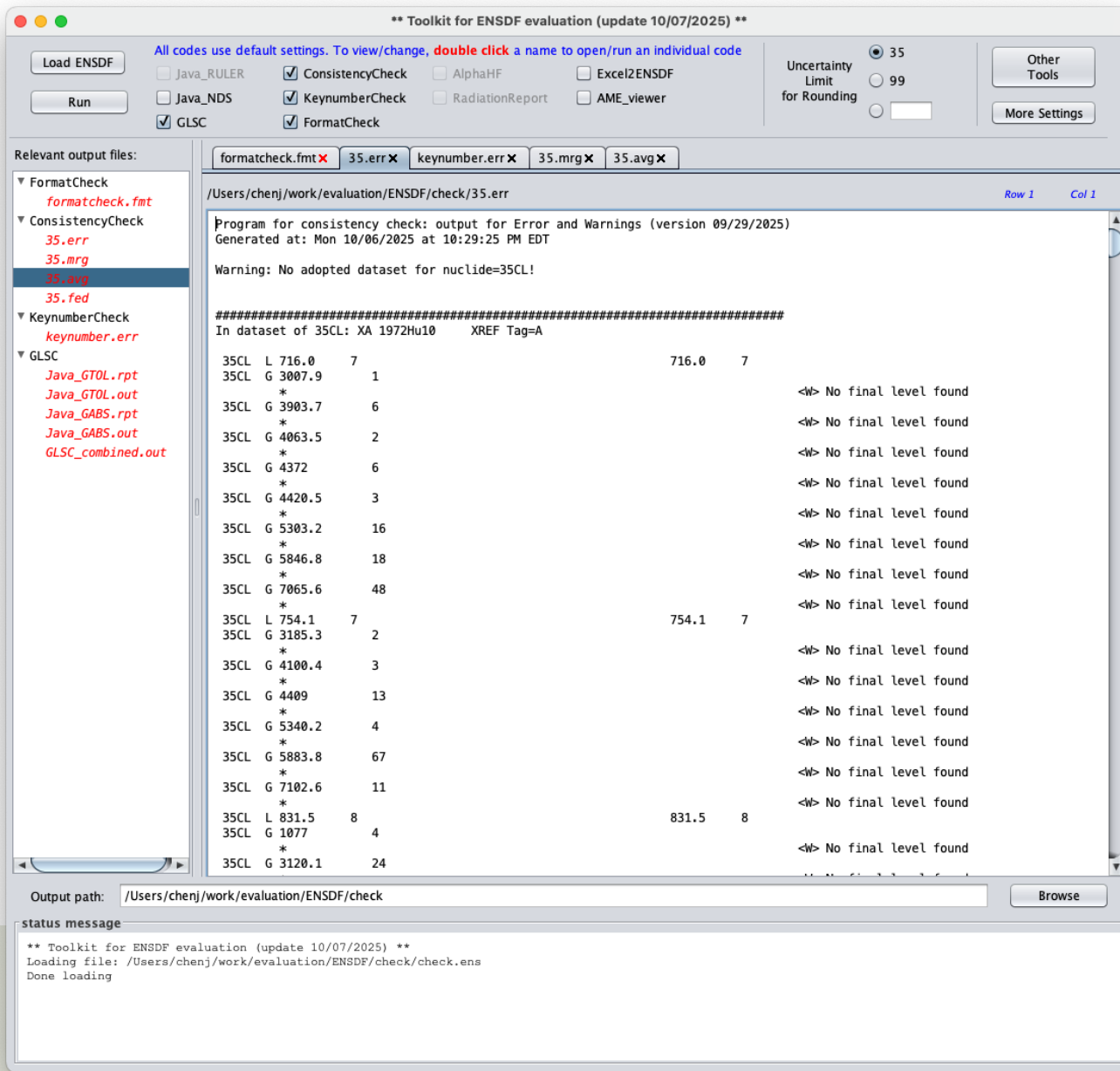
MICHIGAN STATE
UNIVERSITY



U.S. DEPARTMENT OF
ENERGY

Office of
Science

ENSDF Evaluation Toolkit



EvaluationToolkit is a Java toolkit combining all ENSDF Java codes to streamline ENSDF evaluation procedure

- ❑ Provides easy access to all codes in a single app
- ❑ Automatically determines which codes to run based on the type and data of the input dataset
- ❑ Runs all applicable codes in one single click
- ❑ Lists generated output files in one place
- ❑ In-app tabbed viewer for quick view of all generated output files

Eliminate the hassle of figuring out what codes to run for each dataset, executing them one-by-one, and tracking down their buried outputs.

Note: all codes are run with default settings. If customized settings are needed, double click the name of a code to change the settings and run it individually

ENSDF Evaluation Toolkit

**** Toolkit for ENSDF evaluation (update 10/07/2025) ****

Load ENSDF Run

All codes use default settings. To view/change, double click a name to open/run an individual code

☐ Java_RULER ☒ ConsistencyCheck ☐ AlphaHF ☐ Excel2ENSDF
☐ Java_NDS ☒ KeynumberCheck ☐ RadiationReport ☐ AME_viewer
☒ GLSC ☒ FormatCheck

Uncertainty Limit for Rounding: 35 99

Other Tools More Settings

Relevant output files: formatcheck.fmt x 35.err x keynumber.err x 35.mrg x 35.avg x

▼ FormatCheck
formatcheck.fmt
▼ ConsistencyCheck
35.err
35.mrg
35.fed
▼ KeynumberCheck
keynumber.err
▼ GLSC
Java_GTOL.rpt
Java_GTOL.out
Java_GABS.rpt
Java_GABS.out
GLSC_combined.out

/Users/chenj/work/evaluation/ENSDF/check/35.err

Program for consistency check: output for Error and Warnings (version 09/29/2025)
Generated at: Mon 10/06/2025 at 10:29:25 PM EDT

Warning: No adopted dataset for nuclide=35CL!

In dataset of 35CL: XA 1972Hu10 XREF Tag=A

35CL	L	716.0	7			
35CL	G	3007.9	1			
	*					<w> No final level found
35CL	G	3903.7	6			
	*					<w> No final level found
35CL	G	4063.5	2			
	*					<w> No final level found
35CL	G	4372	6			
	*					<w> No final level found
35CL	G	4420.5	3			
	*					<w> No final level found
35CL	G	5303.2	16			
	*					<w> No final level found
35CL	G	5846.8	18			
	*					<w> No final level found
35CL	G	7065.6	48			
	*					<w> No final level found
35CL	L	754.1	7		754.1	7
35CL	G	3185.3	2			
	*					<w> No final level found
35CL	G	4100.4	3			
	*					<w> No final level found
35CL	G	4409	13			
	*					<w> No final level found
35CL	G	5340.2	4			
	*					<w> No final level found
35CL	G	5883.8	67			
	*					<w> No final level found
35CL	G	7102.6	11			
	*					<w> No final level found
35CL	L	831.5	8		831.5	8
35CL	G	1077	4			
	*					<w> No final level found
35CL	G	3120.1	24			

Output path: /Users/chenj/work/evaluation/ENSDF/check Browse

status message

** Toolkit for ENSDF evaluation (update 10/07/2025) **
Loading file: /Users/chenj/work/evaluation/ENSDF/check/check.ens
Done loading

Quick access to useful tools

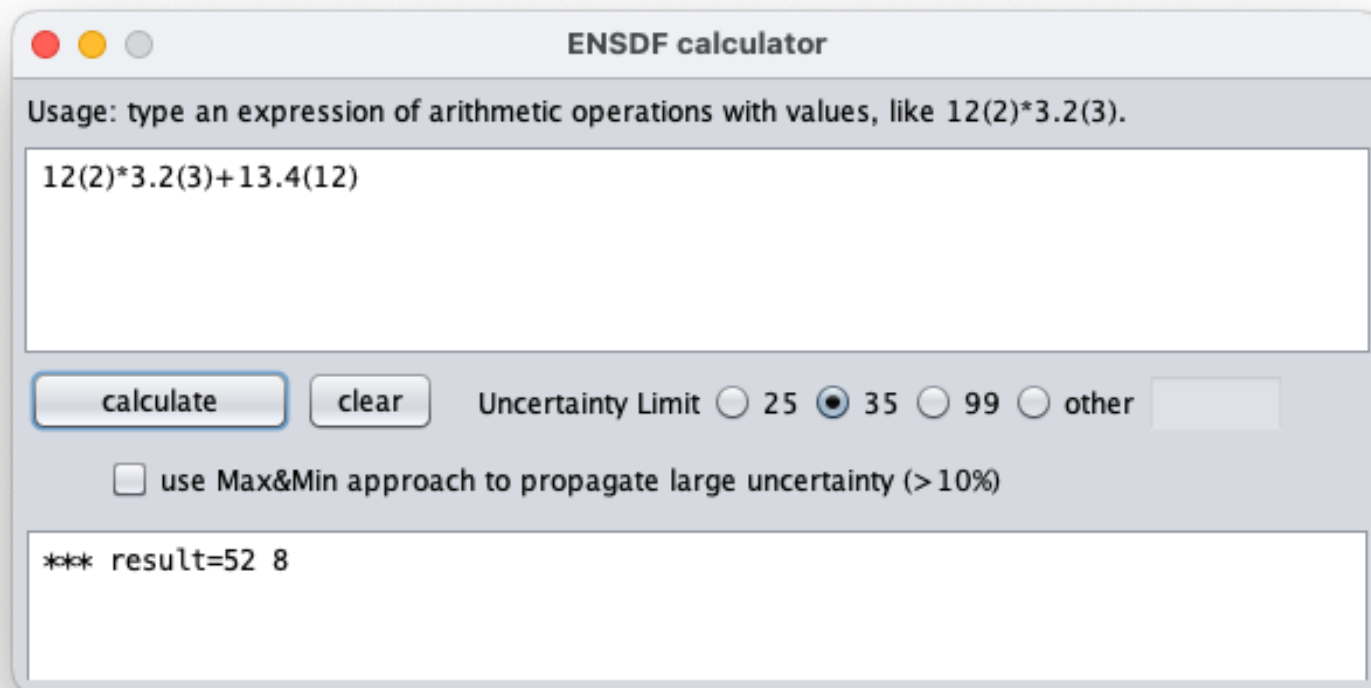
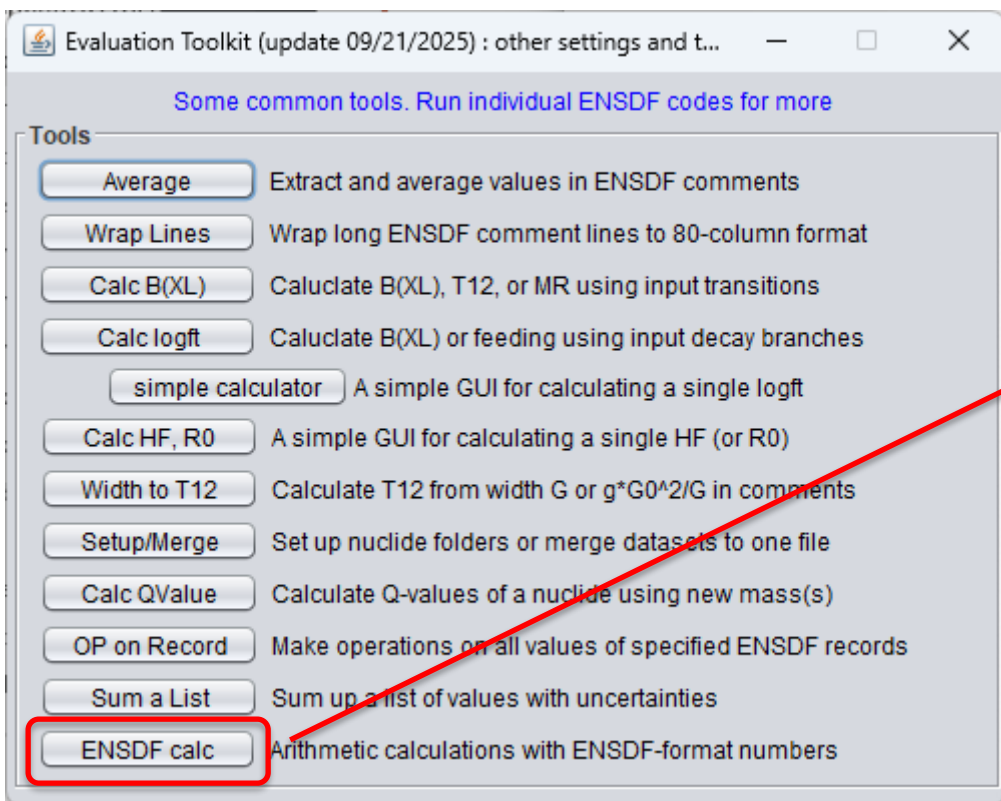
Evaluation Toolkit (update 09/21/2025) : other settings and t...

Some common tools. Run individual ENSDF codes for more

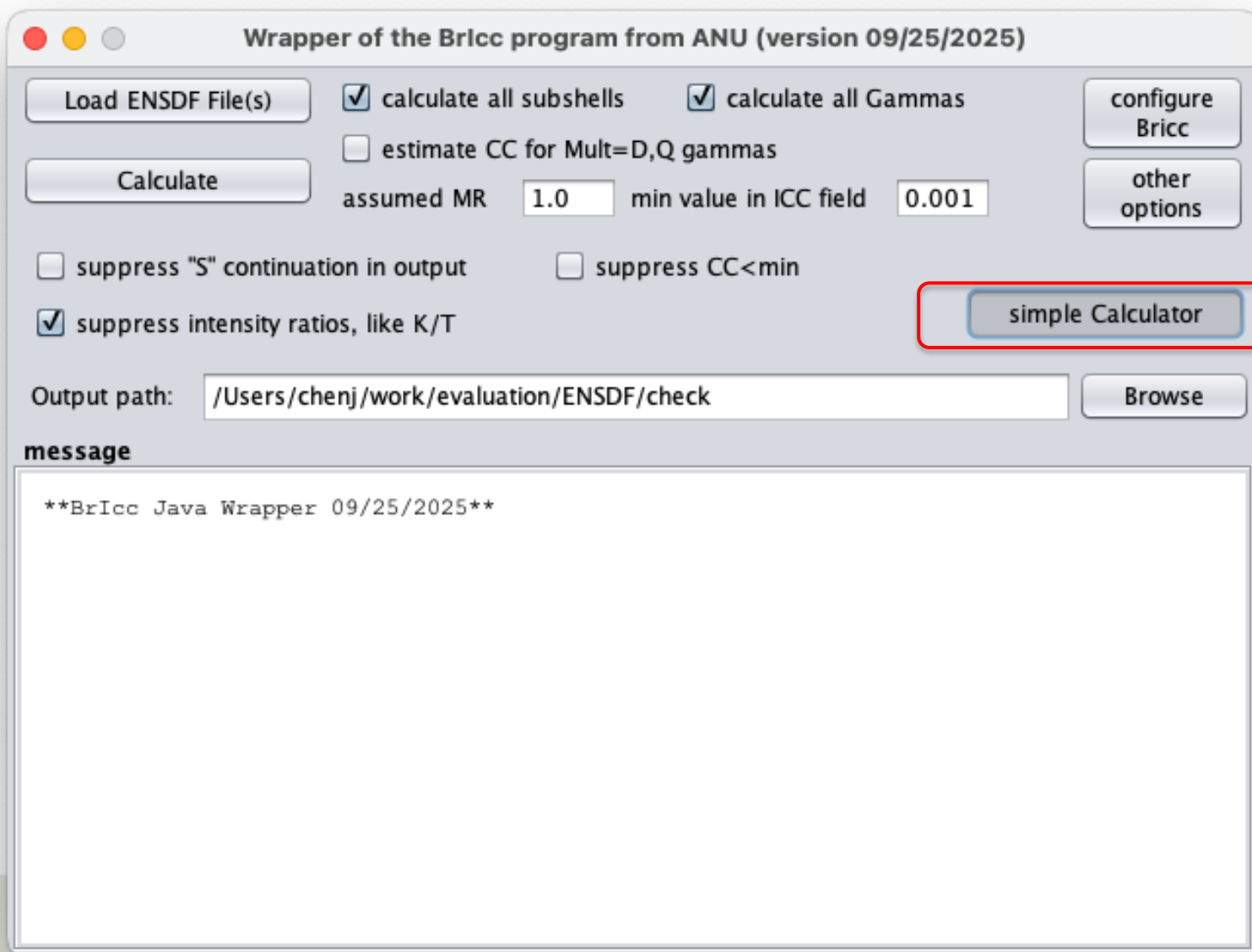
Tools

- Average Extract and average values in ENSDF comments
- Wrap Lines Wrap long ENSDF comment lines to 80-column format
- Calc B(XL) Calculate B(XL), T12, or MR using input transitions
- Calc logft Calculate B(XL) or feeding using input decay branches
- simple calculator A simple GUI for calculating a single logft
- Calc HF, R0 A simple GUI for calculating a single HF (or R0)
- Width to T12 Calculate T12 from width G or $g \cdot G_0^2 / G$ in comments
- Setup/Merge Set up nuclide folders or merge datasets to one file
- Calc QValue Calculate Q-values of a nuclide using new mass(s)
- OP on Record Make operations on all values of specified ENSDF records
- Sum a List Sum up a list of values with uncertainties
- ENSDF calc Arithmetic calculations with ENSDF-format numbers

A convenient tool: ENSDF calculator



A Brlcc Wrapper Tool: BriccWrapper



The screenshot shows the 'Wrapper of the Brlcc program from ANU (version 09/25/2025)' window. It features a 'Load ENSDF File(s)' button, a 'Calculate' button, and several checkboxes: 'calculate all subshells' (checked), 'calculate all Gammas' (checked), 'estimate CC for Mult=D,Q gammas' (unchecked), 'suppress "S" continuation in output' (unchecked), 'suppress CC<min' (unchecked), and 'suppress intensity ratios, like K/T' (checked). There are input fields for 'assumed MR' (1.0) and 'min value in ICC field' (0.001). On the right, there are 'configure Brlcc' and 'other options' buttons. A 'simple Calculator' button is highlighted with a red rectangle. Below these is an 'Output path' field with the text '/Users/chenj/work/evaluation/ENSDF/check' and a 'Browse' button. At the bottom, a 'message' box contains the text '**Brlcc Java Wrapper 09/25/2025**'.

BriccWrapper is a Java wrapper of ANU's Brlcc code

- ❑ Runs ANU's Brlcc code in the background
- ❑ Provides graphical interface for Brlcc settings
- ❑ Provides a simple calculator tool for calculating partial ENSDF datasets

A BrIcc Wrapper Tool: BrIccWrapper

Calculate conversion coefficients of gammas

load an ENSDF or copy and paste part of an ENSDF dataset into the text area below Col 1 clear

220AC G 67.8 2 M1

calculate Uncertainty Limit ☒ 35 ☐ 99 ☐ other copy clear

220AC DG CC\$FROM BrIcc v2.3e (17-Jun-2020) 2008Ki07, "Frozen Orbitals" appr.

220AC Simple BrIcc calculator

220AC G 67.8 2 M1 10.63 18

220ACS G LC=8.05 13\$MC=1.931 32

220ACS G NC=0.512 8\$OC=0.1191 20\$PC=0.0220 4\$QC=0.001959 32

Done!

Partial ENSDF dataset from copy and paste

BrIcc results: ready to be copied and pasted back to an ENSDF dataset

A powerful editor for ENSDF evaluation: VS Code

- ❑ **Microsoft Visual Studio Code (VS Code)** is a free, open-source source code editor widely used by developers worldwide.
- ❑ **It is also very powerful for working with ENSDF datasets:**
 - Offers highly customizable capabilities through user extensions
 - Integrates seamlessly with AI-powered assistants

Both greatly enhancing efficiency
in editing and processing
ENSDF datasets.

File Explorer

check.ens X A74_26September2025.ens formatcheck.fmt 74.mrg 74.adp calcEG.rpt 35.mrg newBrcc.lst new_Cards.mrg HEX

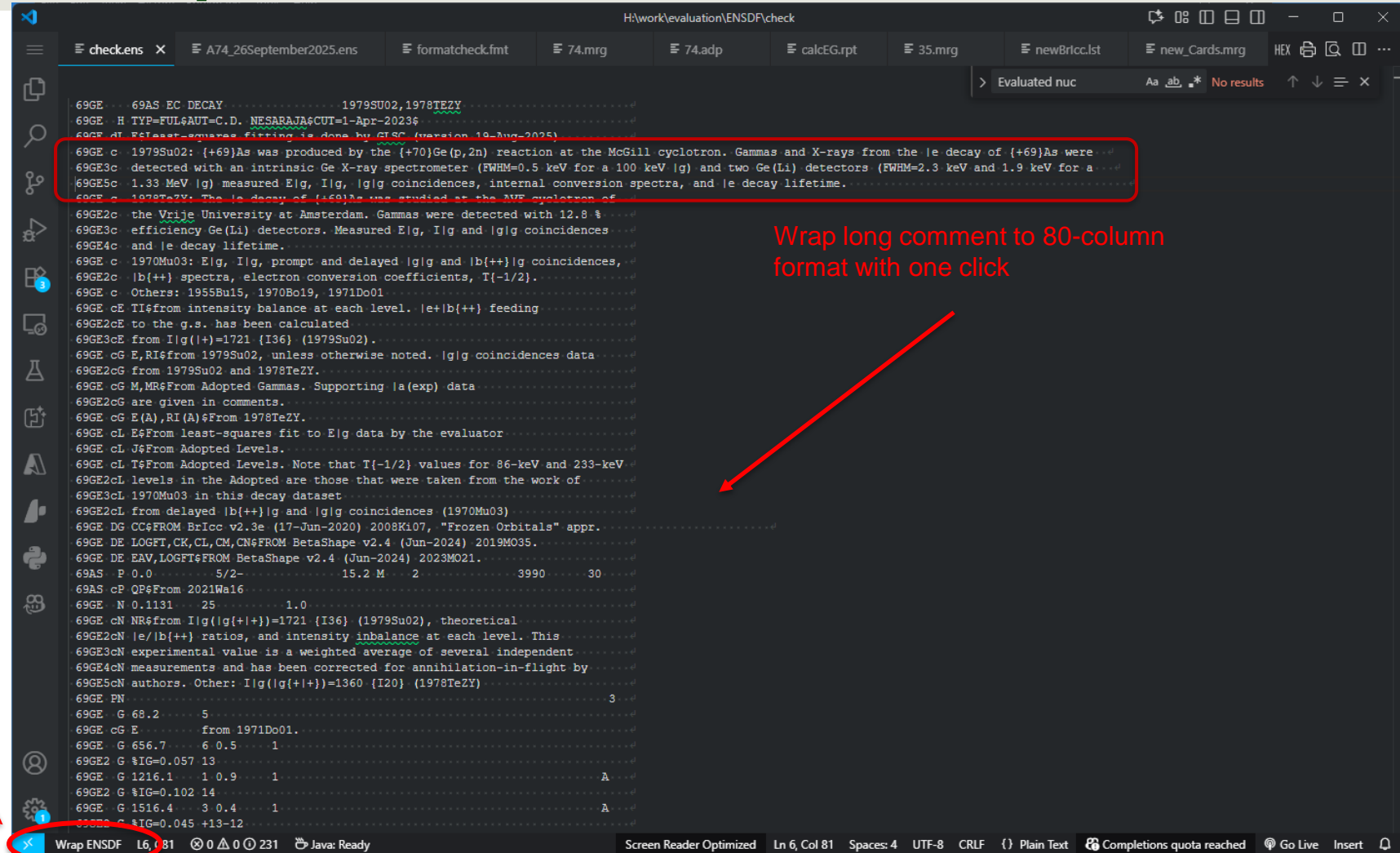
Evaluated nuc Aa ab No results

```
69GE -- 69AS EC DECAPY ..... 1979SU02,1978TEZY .....
69GE H TYP=FUL&AUT=C.D. NESARAJA&CUT=1-Apr-2023$ .....
69GE dL E$Least-squares fitting is done by GLSC (version 19-Aug-2025).....
69GE c 1979SU02: (+69)As was produced by the (+70)Ge(p,2n) reaction at the McGill cyclotron. Gammas and X-rays from the |e decay of (+69)As were...
69GE3c detected with an intrinsic Ge X-ray spectrometer (FWHM=0.5 keV for a 100 keV |g) and two Ge(Li) detectors (FWHM=2.3 keV and 1.9 keV for a...
69GE5c 1.33 MeV |g) measured E|g, I|g, |g|g coincidences, internal conversion spectra, and |e decay lifetime. ....
69GE c 1978TeZY: The |e decay of (+69)As was studied at the AVF cyclotron of ...
69GE2c the Vrije University at Amsterdam. Gammas were detected with 12.8 % ...
69GE3c efficiency Ge(Li) detectors. Measured E|g, I|g and |g|g coincidences...
69GE4c and |e decay lifetime. ....
69GE c 1970Mu03: E|g, I|g, prompt and delayed |g|g and |b{++}|g coincidences,...
69GE2c |b{++} spectra, electron conversion coefficients, T(-1/2). ....
69GE c Others: 1955Bu15, 1970Bo19, 1971Do01.....
69GE cE TI$from intensity balance at each level. |e|b{++} feeding .....
69GE2cE to the g.s. has been calculated .....
69GE3cE from I|g(I+)=1721 {I36} (1979Su02). ....
69GE cG E,RI$from 1979Su02, unless otherwise noted. |g|g coincidences data.....
69GE2cG from 1979Su02 and 1978TeZY. ....
69GE cG M,MR$From Adopted Gammas. Supporting |a(exp) data.....
69GE2cG are given in comments. ....
69GE cG E(A),RI(A)$From 1978TeZY. ....
69GE cL E$From least-squares fit to E|g data by the evaluator.....
69GE cL J$From Adopted Levels. ....
69GE cL T$From Adopted Levels. Note that T(-1/2) values for 86-keV and 233-keV...
69GE2cL levels in the Adopted are those that were taken from the work of.....
69GE3cL 1970Mu03 in this decay dataset .....
69GE2cL from delayed |b{++}|g and |g|g coincidences (1970Mu03) .....
69GE DG CC$FROM BrIoc v2.3e (17-Jun-2020) 2008Ki07, "Frozen Orbitals" appr. ....
69GE DE LOGFT,CK,CL,CM,CN$FROM BetaShape v2.4 (Jun-2024) 2019MO35. ....
69GE DE EAV,LOGFT$FROM BetaShape v2.4 (Jun-2024) 2023MO21. ....
69AS P 0.0 ..... 5/2- ..... 15.2 M ..... 2 ..... 3990 ..... 30 .....
69AS cP QP$From 2021Wa16 .....
69GE N 0.1131 ..... 25 ..... 1.0 .....
69GE cN NR$from I|g(|g{I+})=1721 {I36} (1979Su02), theoretical .....
69GE2cN |e/|b{++} ratios, and intensity imbalance at each level. This .....
69GE3cN experimental value is a weighted average of several independent .....
69GE4cN measurements and has been corrected for annihilation-in-flight by .....
69GE5cN authors. Other: I|g(|g{I+})=1360 {I20} (1978TeZY) .....
69GE PN ..... 3 .....
69GE G 68.2 ..... 5 .....
69GE cG E ..... from 1971Do01. ....
69GE G 656.7 ..... 6 0.5 ..... 1 .....
69GE2 G %IG=0.057 13 .....
69GE G 1216.1 ..... 1 0.9 ..... 1 ..... A .....
69GE2 G %IG=0.102 14 .....
69GE G 1516.4 ..... 3 0.4 ..... 1 ..... A .....
69GE2 G %IG=0.045 +13-12 .....
```

Wrap ENSDF L6, C81 X 0 A 0 231 Java: Ready Screen Reader Optimized Ln 6, Col 81 Spaces: 4 UTF-8 CRLF {} Plain Text Completions quota reached Go Live Insert

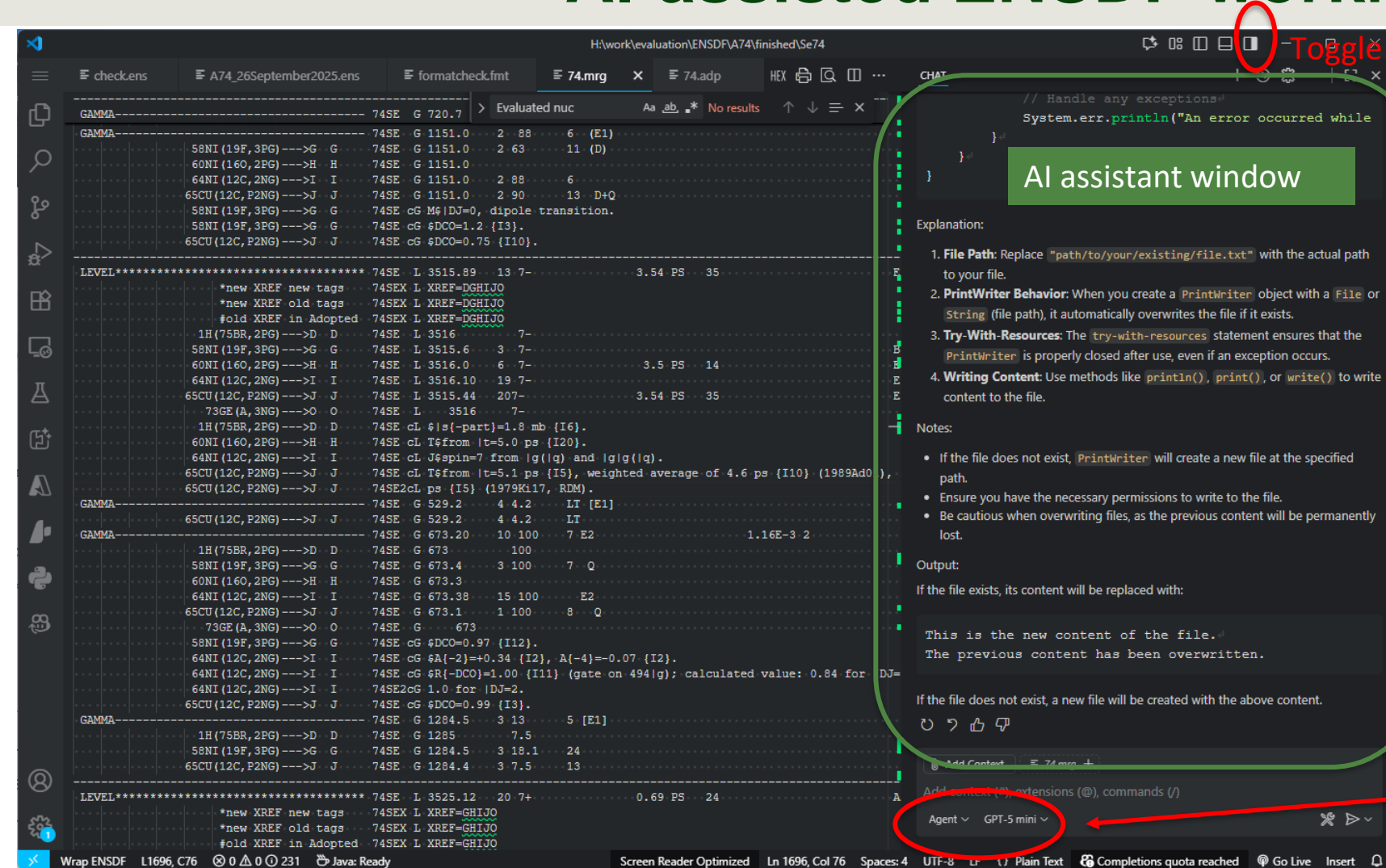
A powerful editor for ENSDF evaluation: auto-wrap ENSDF 80-column

A specialized extension “ENSDF-auto-wrap” developed by the FRIB data group for wrapping freely-typed text to ENSDF 80-column format with a single click, eliminating the hassle for tedious manual formatting



Extension installation file: <https://github.com/sunlijie-msu/Auto-wrap/blob/main/ensdf-auto-wrap-0.1.0.vsix>

A powerful editor for ENSDF evaluation: AI-assisted ENSDF workflow



Toggle AI assistant window

AI assistant window

A more advanced **AI-assisted ENSDF formatting** tool with VS Code has been developed and been used in an early stage in ENSDF evaluation. It is actively under continuous development and improvement.

VS code seamlessly integrates with all popular AI assistants (free and paid versions)

Selection of AI mode and model

See L.J. Sun's talk for more details



Facility for Rare Isotope Beams
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