Update on ENSDF Tools

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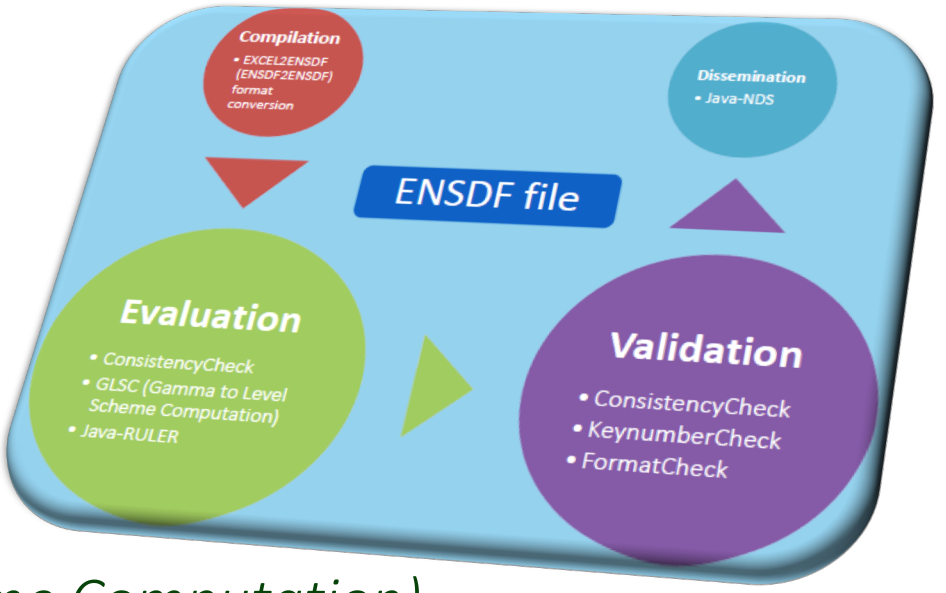
MICHIGAN STATE UNIVERSITY

U.S. DEPARTMENT OF ENERGY | Office of Science

Code developments for ENSDF

ENSDF evaluation tools:



- *McMaster-MSU Java-NDS*
- *ConsistencyCheck*
- *KeynumberCheck*
- *Java-RULER*
- *Excel2ENSDF*
- *GLSC (Gamma to Level Scheme Computation)*

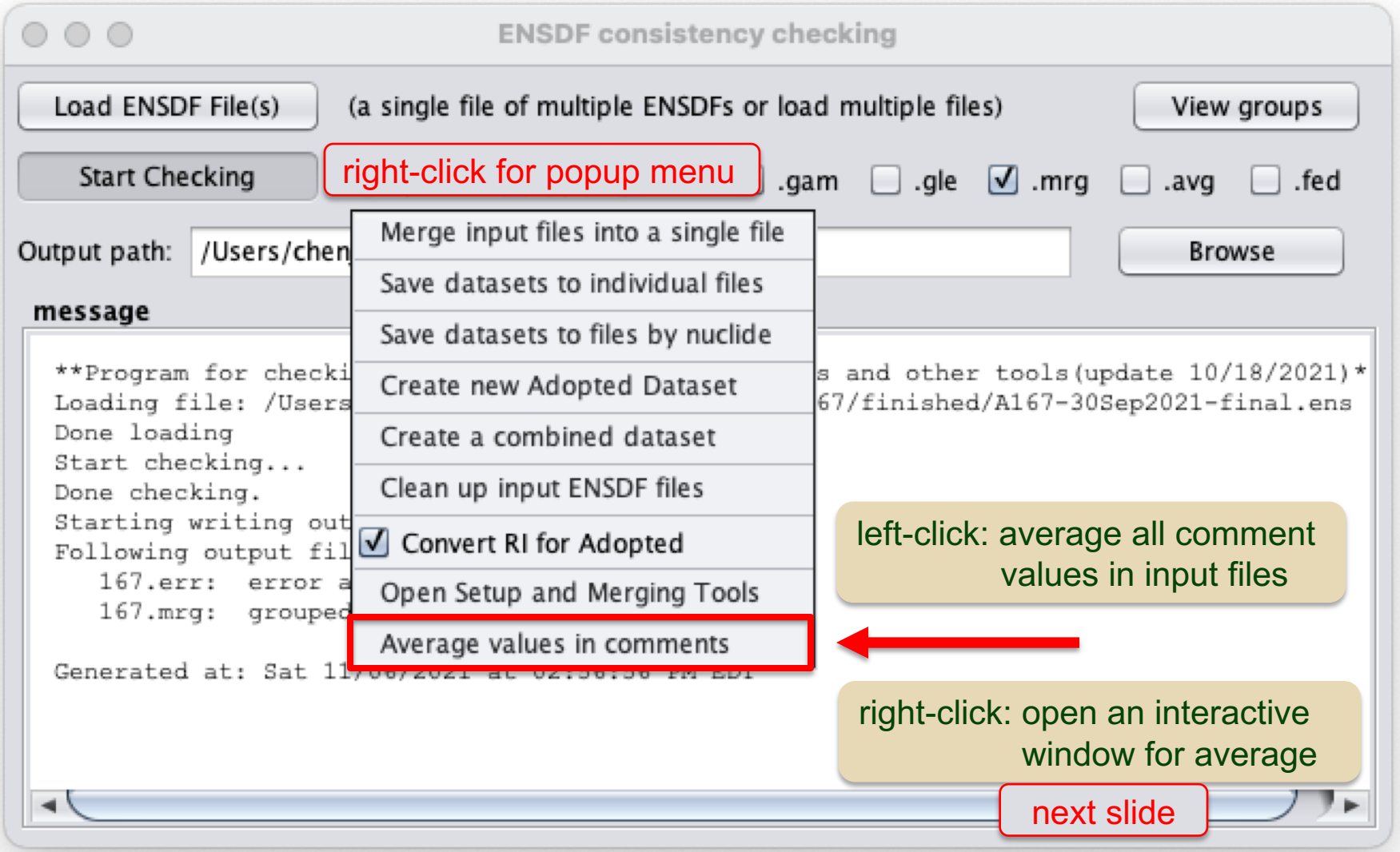
  an alternative to the combination of legacy GTOL, GABS and more
- *AME-NUBASE retrieval tool*

  has a function to update all Q records in datasets with a few clicks
- *ENSDFSearch (a standalone tool; under development)*

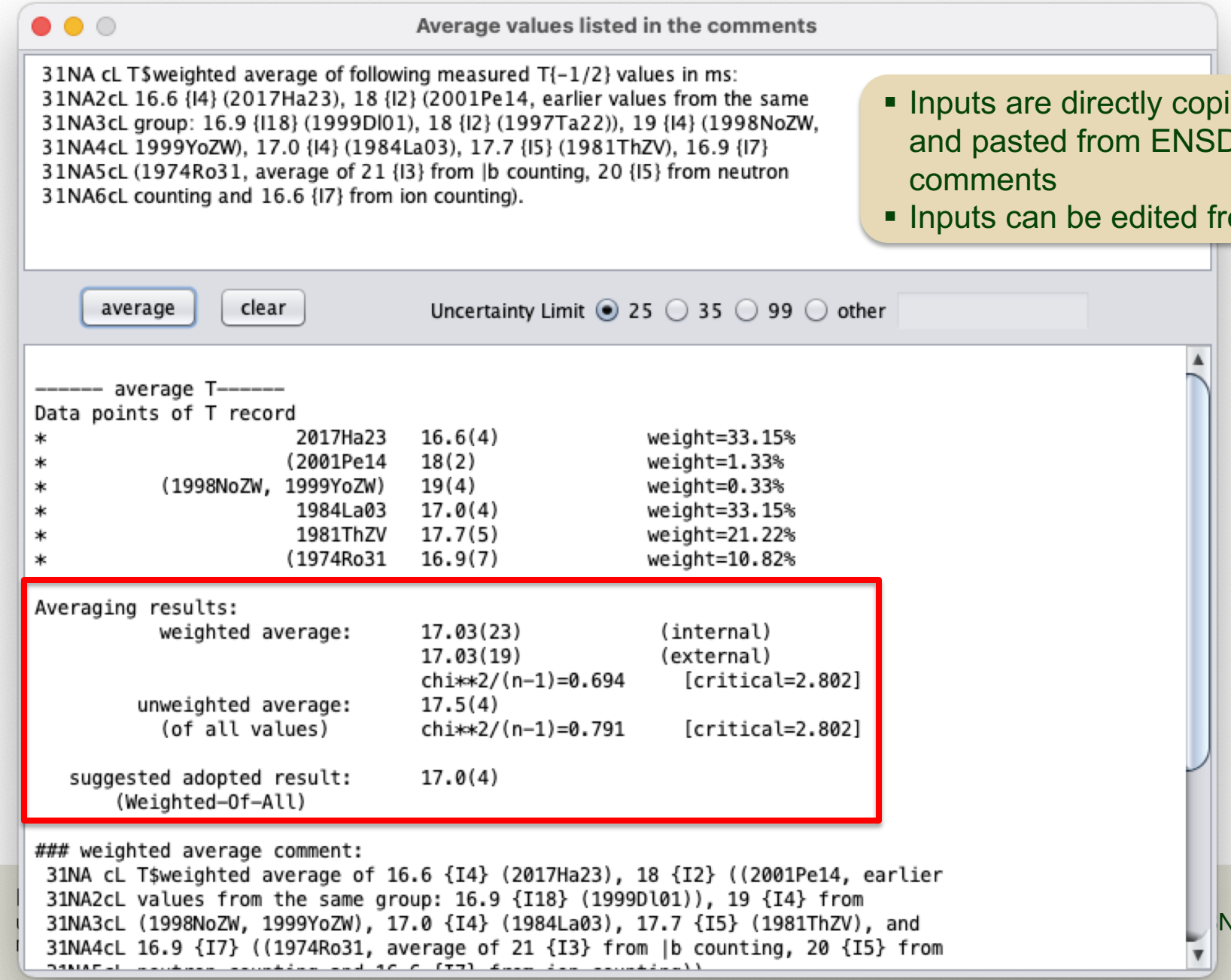
  search anything in ENSDF and XUNDL with customized-search capability

Codes are available in Google Drive for downloading:
https://drive.google.com/drive/folders/1dCkFVZVIUeDUdmuJ8ts6P5UC_TUDlCkZ?usp=sharing

ConsistencyCheck:
average values in ENSDF comments

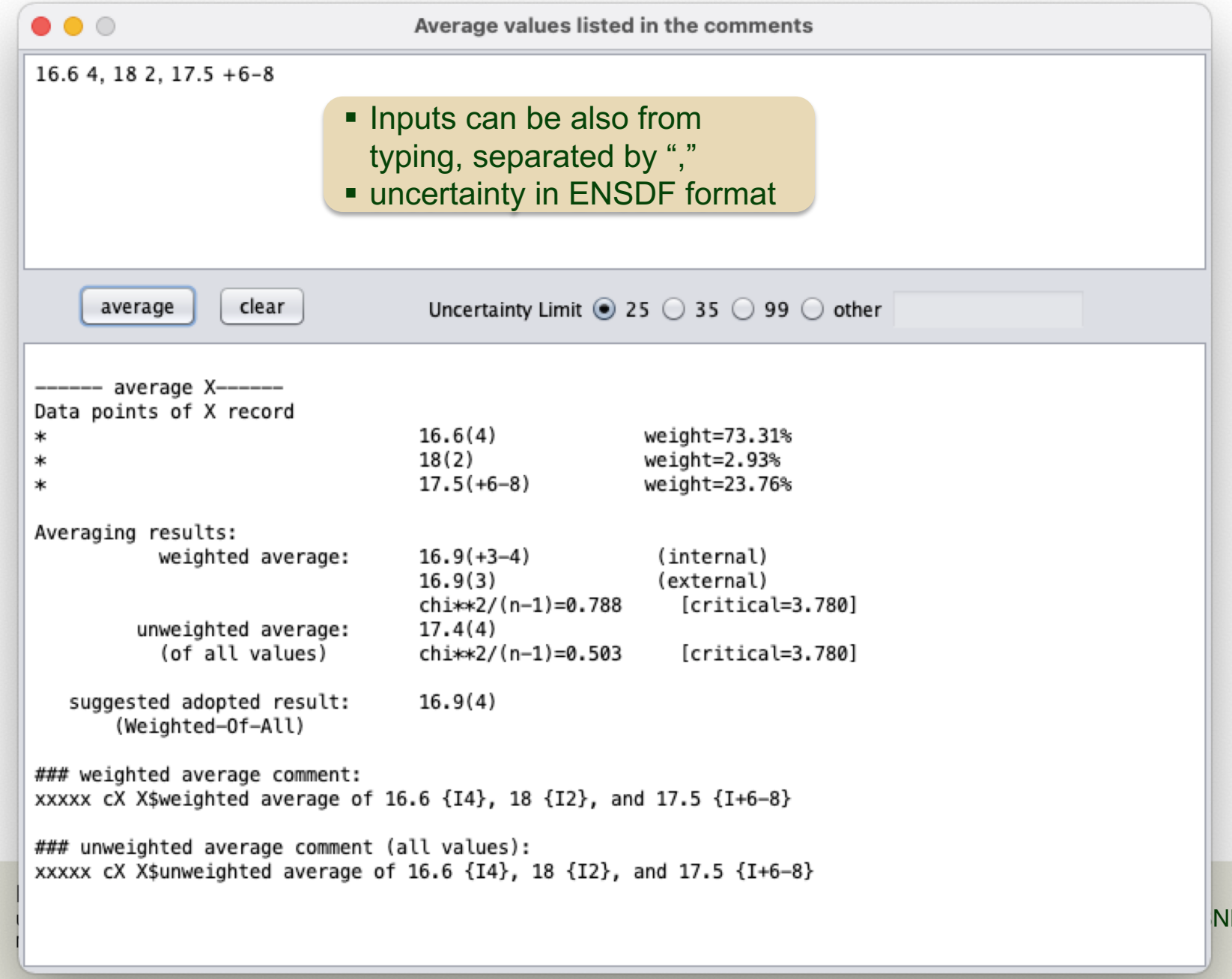


ConsistencyCheck:
average values in ENSDF comments

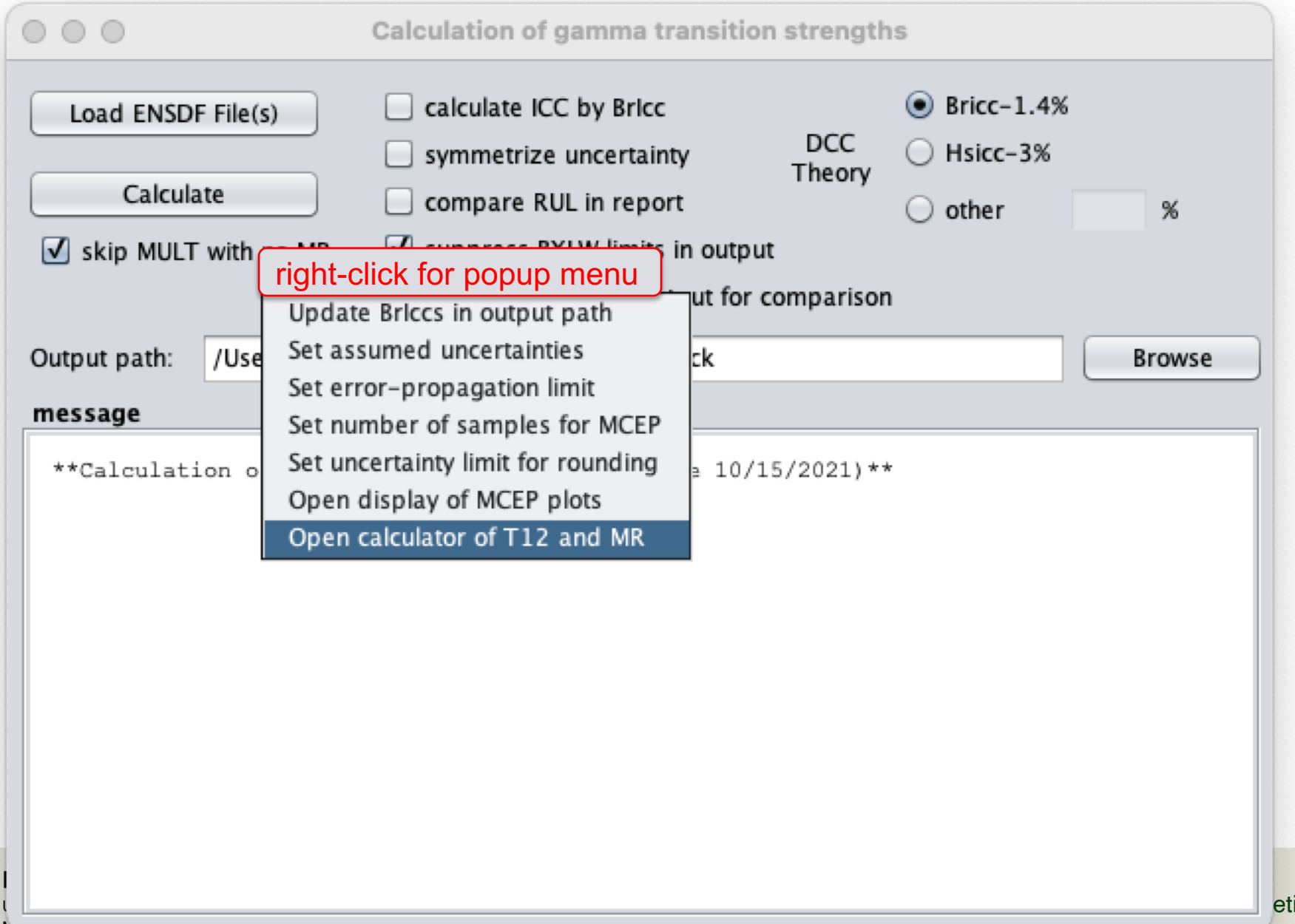


- Inputs are directly copied and pasted from ENSDF comments
- Inputs can be edited freely

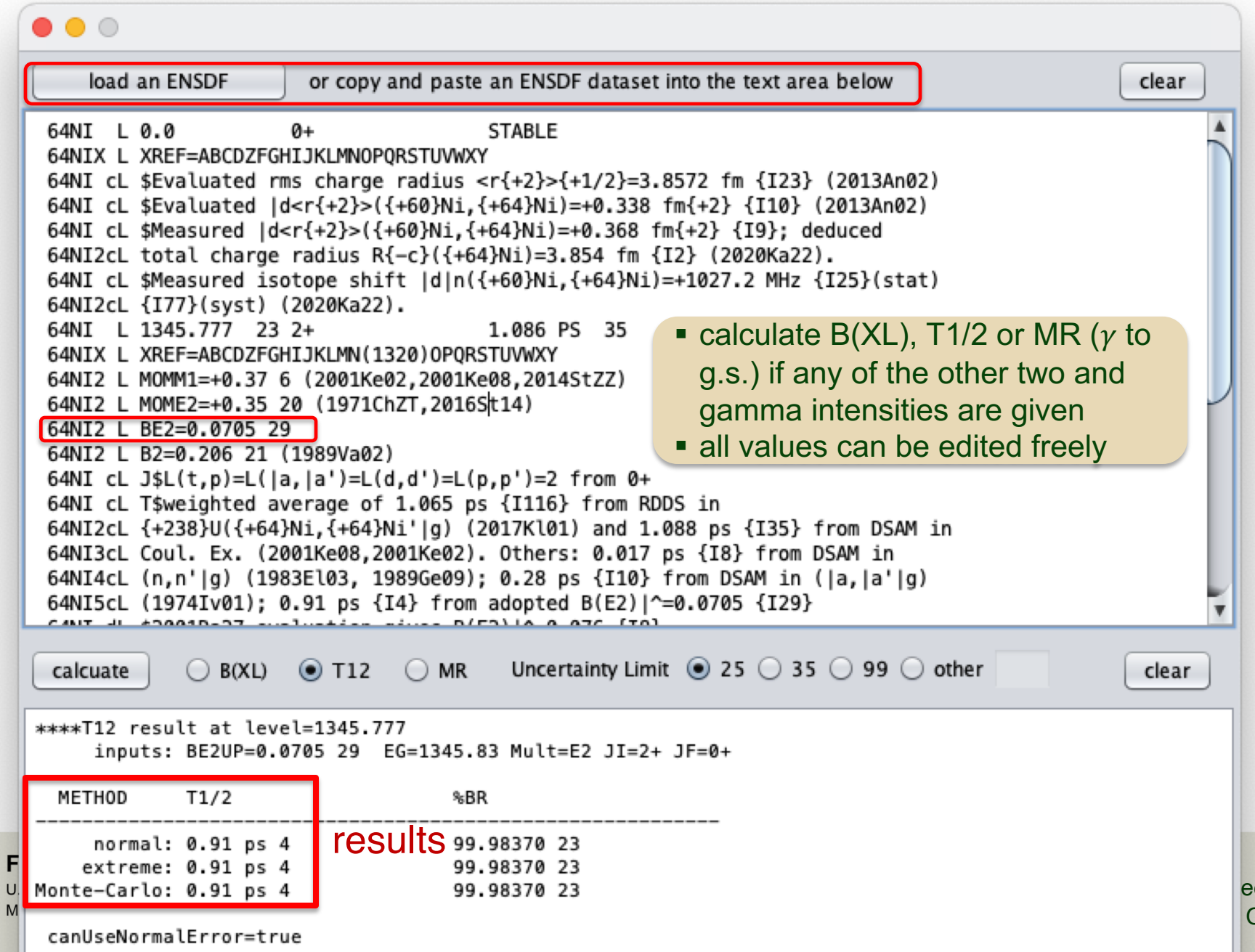
ConsistencyCheck:
average values in ENSDF comments



Java-RULER:
calculator for B(XL), T1/2 and MR



Java-RULER:
calculator for B(XL), T1/2 and MR

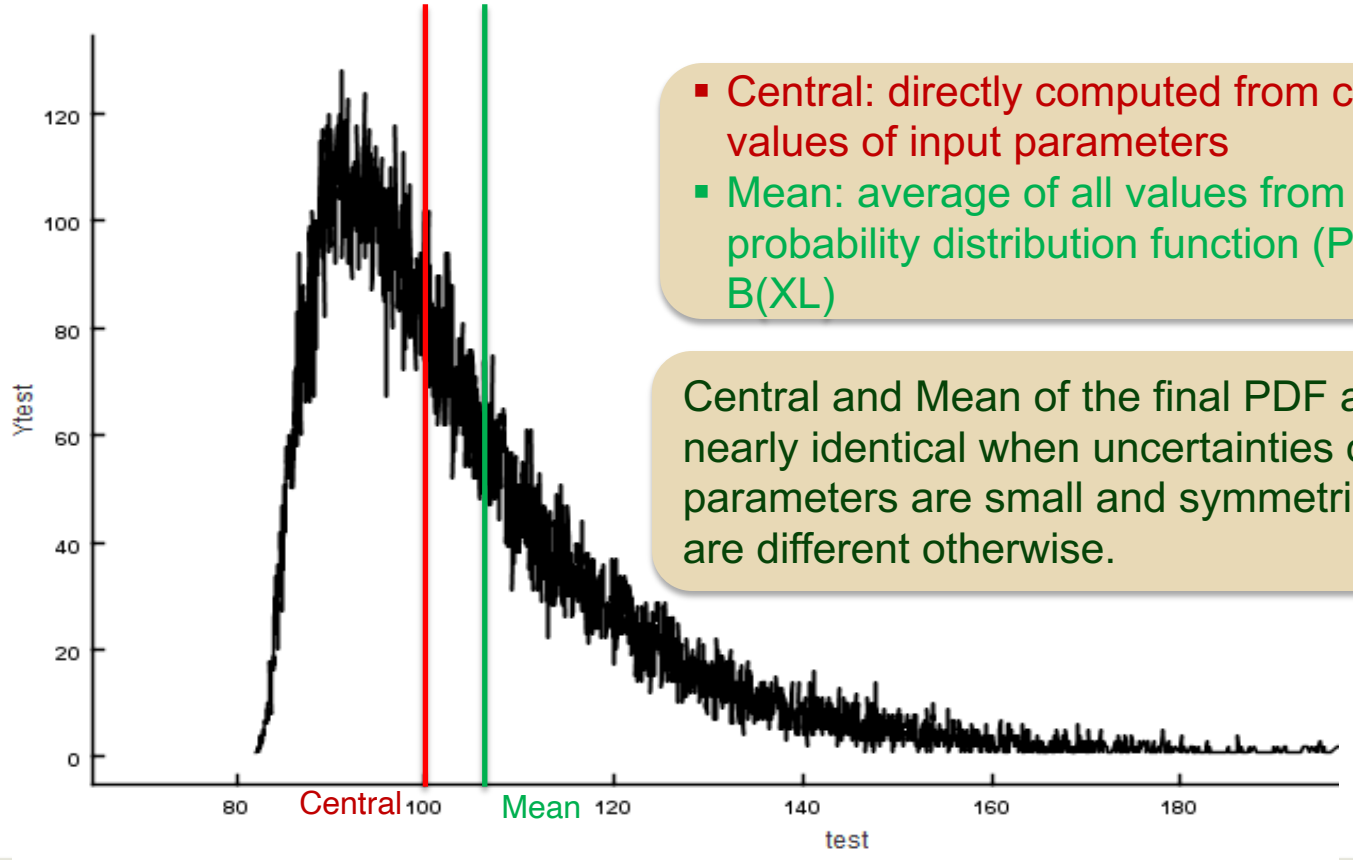


- calculate B(XL), T1/2 or MR (γ to g.s.) if any of the other two and gamma intensities are given
- all values can be edited freely

results

Java-RULER:
decision needed

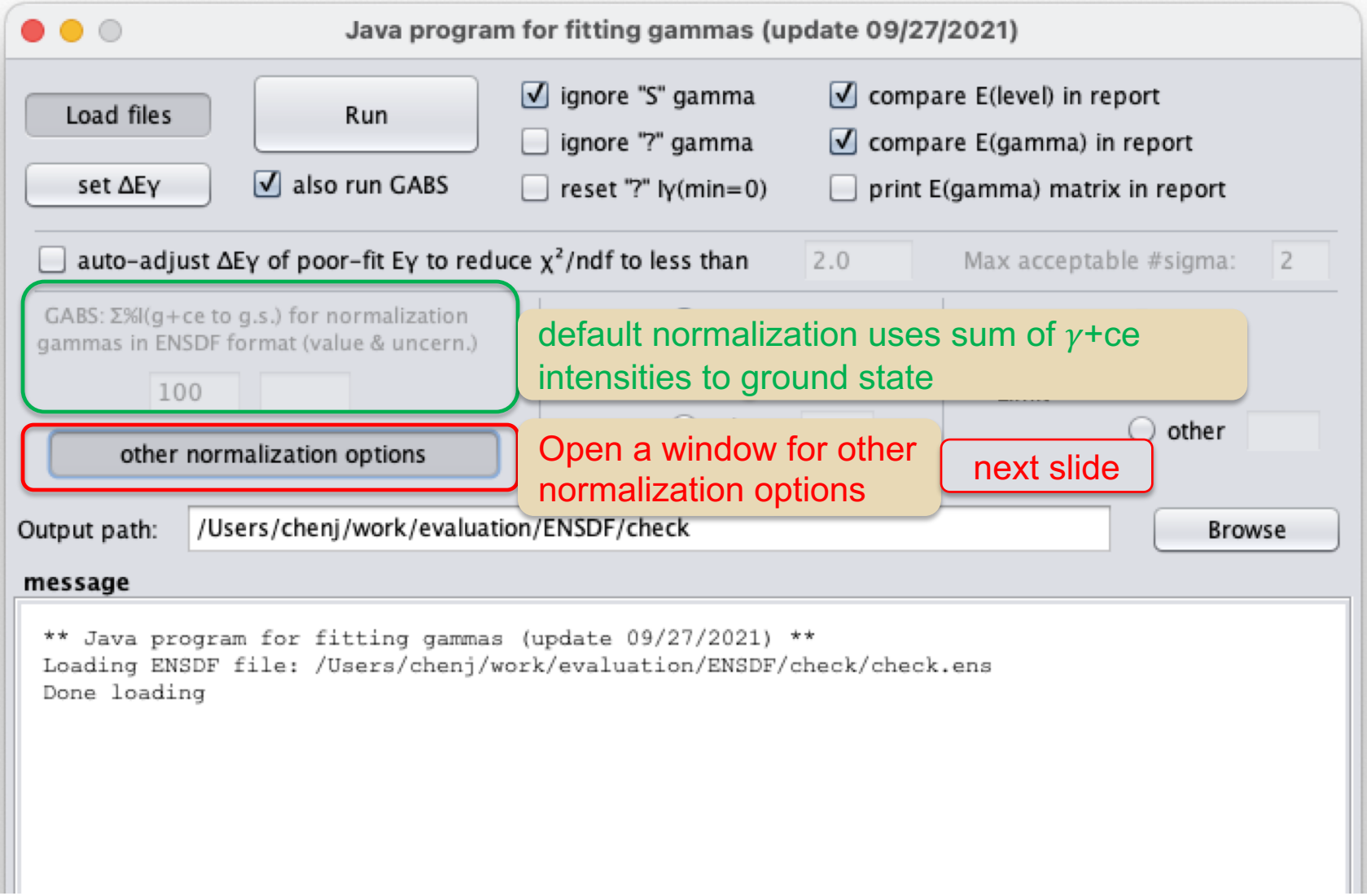
Java-RULER has been compared with **UncTools** by Tibor and tested by Filip for the Monte-Carlo approach for error-propagation; two codes give consistent results but decision is needed on the final value to be adopted: ***Central*** or ***Mean*** of the probability distribution function (PDF) of B(XL)



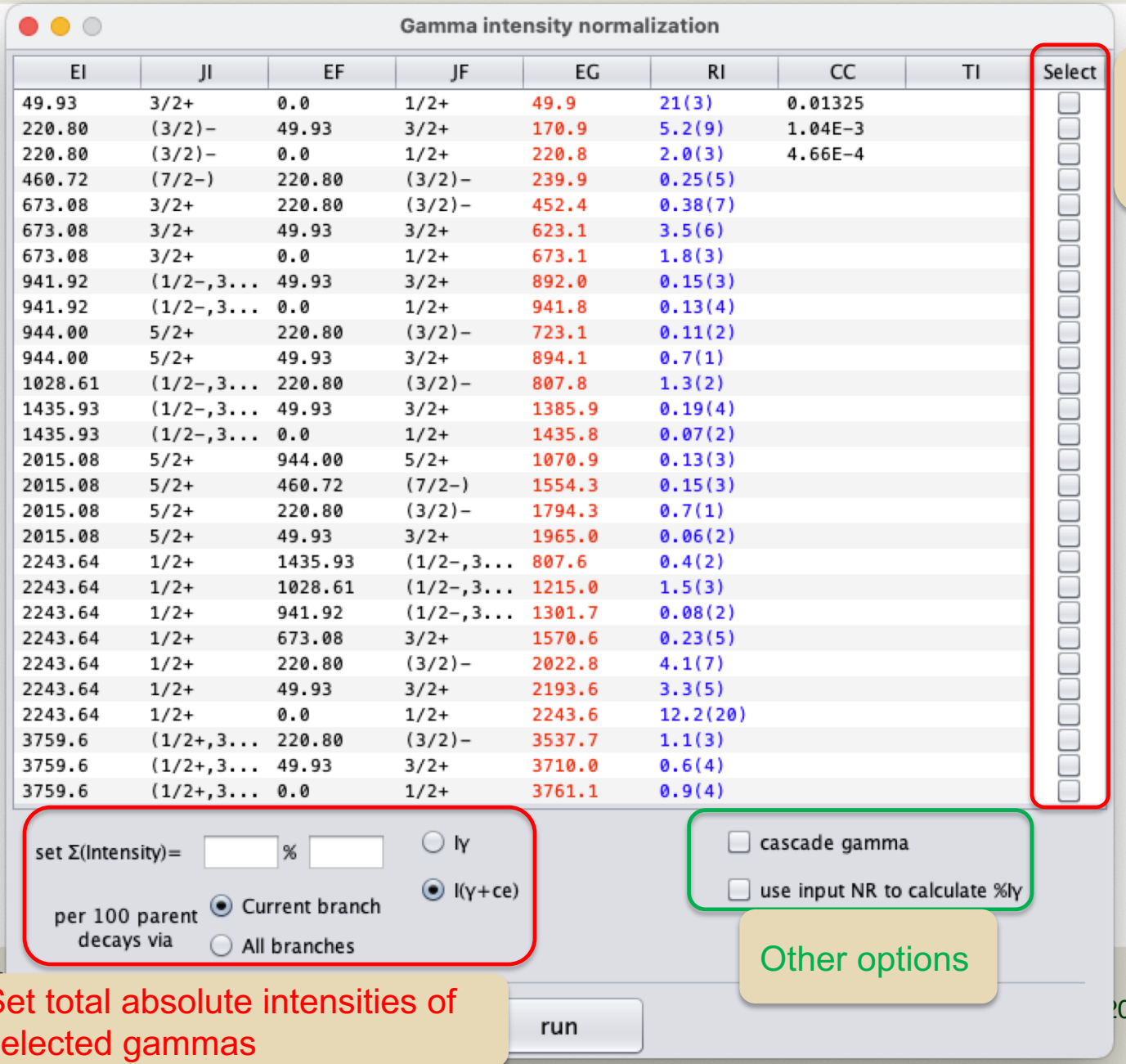
- Central: directly computed from central values of input parameters
- Mean: average of all values from the probability distribution function (PDF) of B(XL)

Central and Mean of the final PDF are nearly identical when uncertainties of input parameters are small and symmetric, but are different otherwise.

GLSC (Gamma to Level Scheme Computation): %Iγ normalization tool



GLSC (Gamma to Level Scheme Computation): %Iγ normalization tool

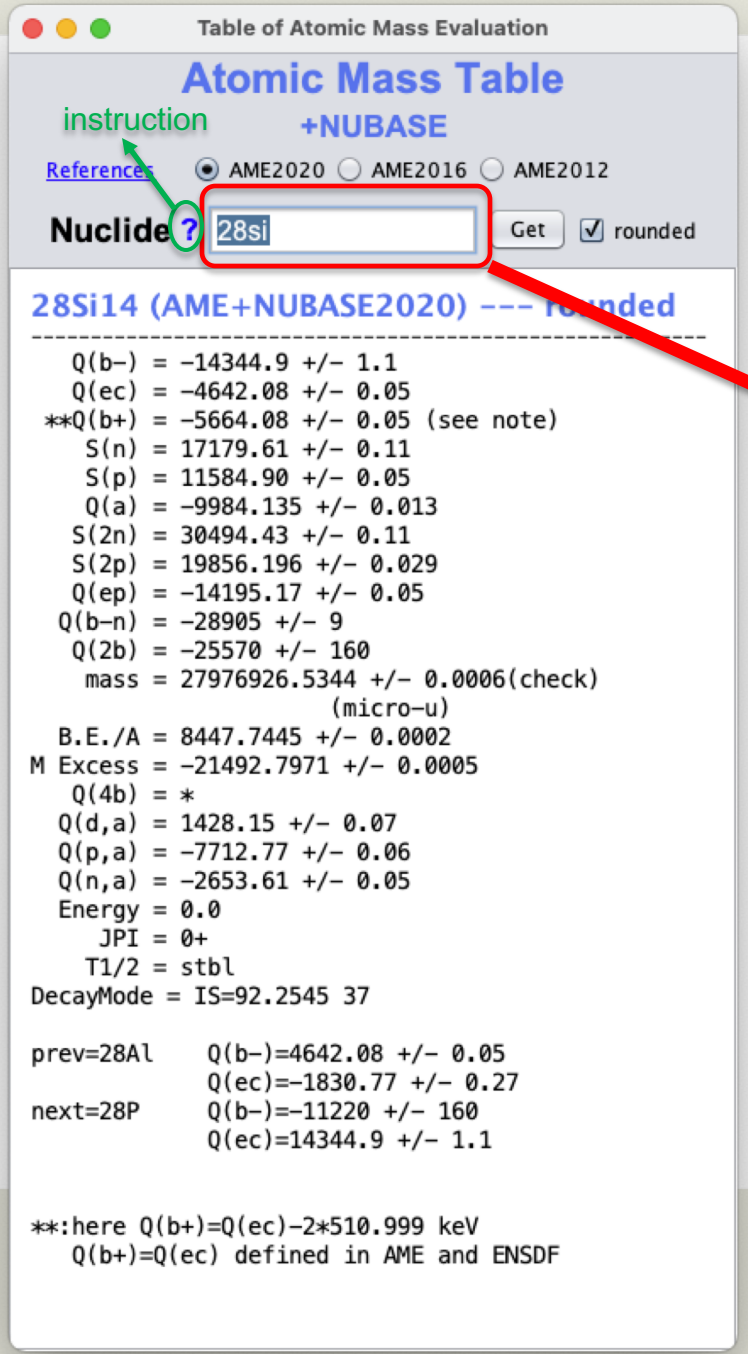


Select normalization gammas

Other options

Set total absolute intensities of selected gammas

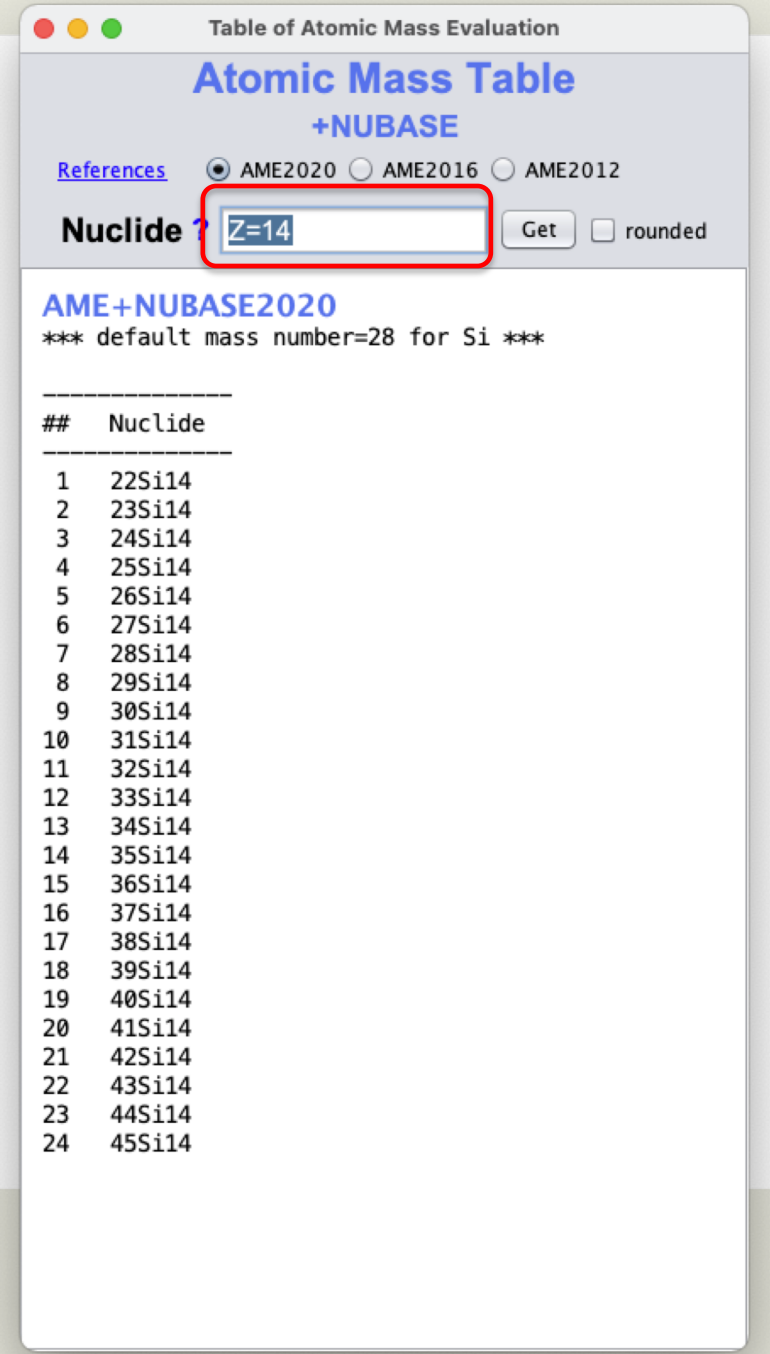
AME-NUBASE retrieval tool

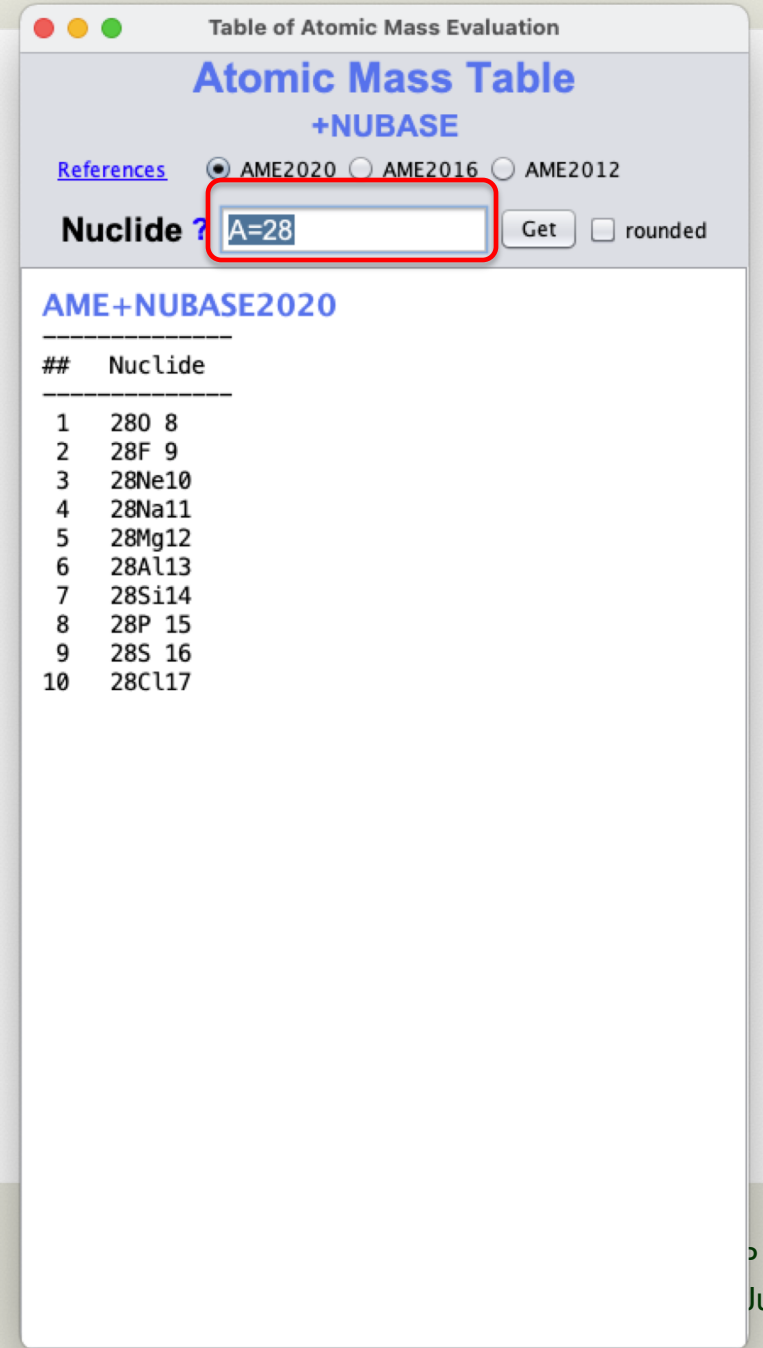


- AME2020 & NUBASE2020
- main usage: automatically update Q record in an input ENSDF file

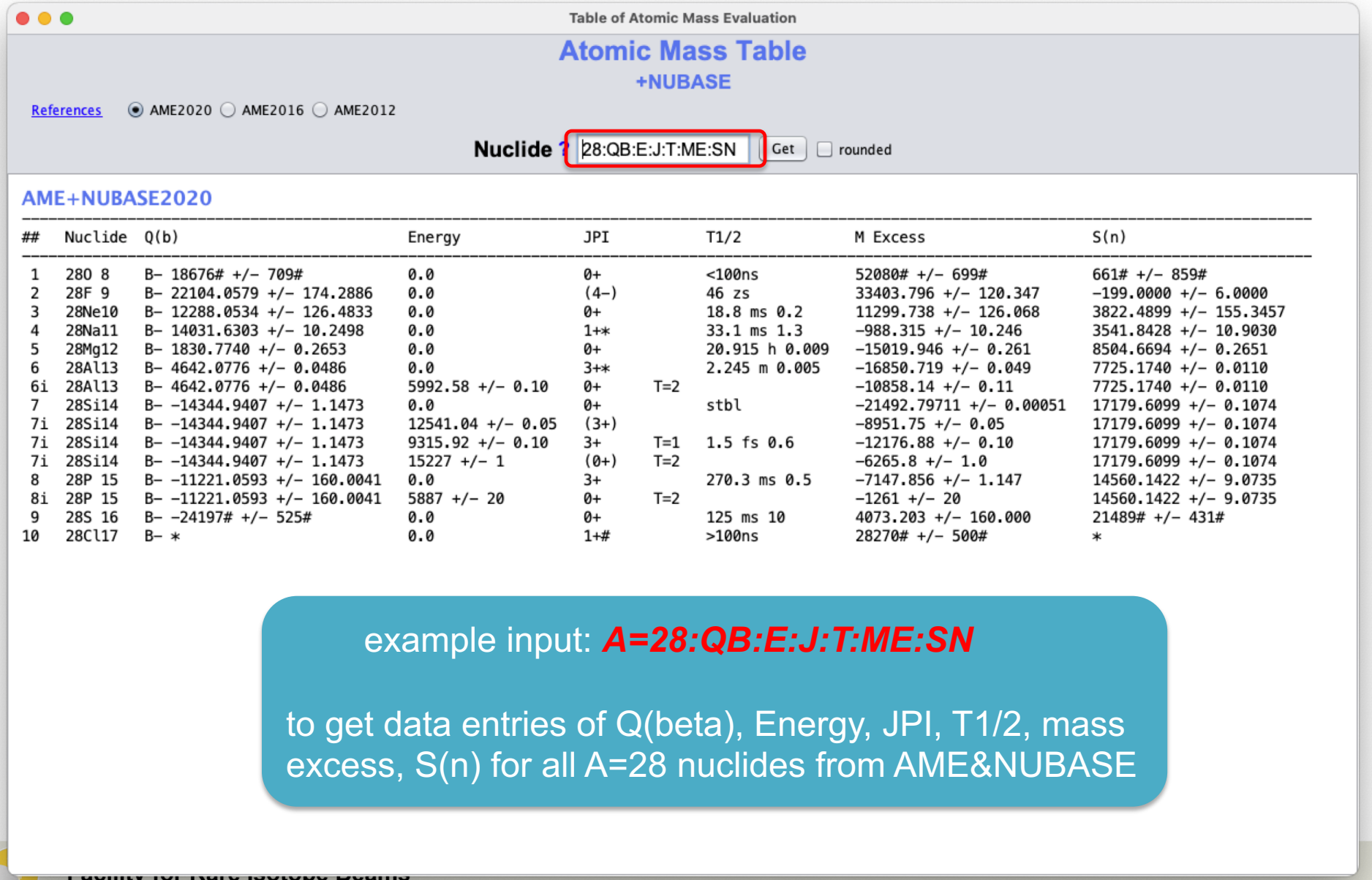
- to get all AME entries for a single nuclide
  type nuclide name, like, ***28Si***
- to list all isotopes of an element
  type element symbol or Z=##, like ***Si*** or ***Z=14***
- to list all isotones of the same mass
  type A=## or ##, like ***A=28*** or ***28***
- to get specific data entries of a nuclide or nuclides, type any of inputs above followed by the entry names, separated by :, like
  A=28:QB:E:J:T:ME:SN

AME-NUBASE retrieval tool





AME-NUBASE retrieval tool



AME+NUBASE2020

##	Nuclide	Q(b)	Energy	JPI	T1/2	M Excess	S(n)
1	28O 8	B- 18676# +/- 709#	0.0	0+	<100ns	52080# +/- 699#	661# +/- 859#
2	28F 9	B- 22104.0579 +/- 174.2886	0.0	(4-)	46 zs	33403.796 +/- 120.347	-199.0000 +/- 6.0000
3	28Ne10	B- 12288.0534 +/- 126.4833	0.0	0+	18.8 ms 0.2	11299.738 +/- 126.068	3822.4899 +/- 155.3457
4	28Na11	B- 14031.6303 +/- 10.2498	0.0	1+*	33.1 ms 1.3	-988.315 +/- 10.246	3541.8428 +/- 10.9030
5	28Mg12	B- 1830.7740 +/- 0.2653	0.0	0+	20.915 h 0.009	-15019.946 +/- 0.261	8504.6694 +/- 0.2651
6	28Al13	B- 4642.0776 +/- 0.0486	0.0	3+*	2.245 m 0.005	-16850.719 +/- 0.049	7725.1740 +/- 0.0110
6i	28Al13	B- 4642.0776 +/- 0.0486	5992.58 +/- 0.10	0+ T=2		-10858.14 +/- 0.11	7725.1740 +/- 0.0110
7	28Si14	B- -14344.9407 +/- 1.1473	0.0	0+	stbl	-21492.79711 +/- 0.00051	17179.6099 +/- 0.1074
7i	28Si14	B- -14344.9407 +/- 1.1473	12541.04 +/- 0.05	(3+)		-8951.75 +/- 0.05	17179.6099 +/- 0.1074
7i	28Si14	B- -14344.9407 +/- 1.1473	9315.92 +/- 0.10	3+ T=1	1.5 fs 0.6	-12176.88 +/- 0.10	17179.6099 +/- 0.1074
7i	28Si14	B- -14344.9407 +/- 1.1473	15227 +/- 1	(0+) T=2		-6265.8 +/- 1.0	17179.6099 +/- 0.1074
8	28P 15	B- -11221.0593 +/- 160.0041	0.0	3+	270.3 ms 0.5	-7147.856 +/- 1.147	14560.1422 +/- 9.0735
8i	28P 15	B- -11221.0593 +/- 160.0041	5887 +/- 20	0+ T=2		-1261 +/- 20	14560.1422 +/- 9.0735
9	28S 16	B- -24197# +/- 525#	0.0	0+	125 ms 10	4073.203 +/- 160.000	21489# +/- 431#
10	28Cl17	B- *	0.0	1+#	>100ns	28270# +/- 500#	*

example input: ***A=28:QB:E:J:T:ME:SN***

to get data entries of Q(beta), Energy, JPI, T1/2, mass excess, S(n) for all A=28 nuclides from AME&NUBASE