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**ENDF/B-VII.1 vs. CIELO**

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**Overview**

The CIELO (Collaborative International Evaluated Library Organization) project is designed to improve our internationally available evaluated nuclear data. Currently they are working on,

- 1) H in H<sub>2</sub>O
- 2) O-16
- 3) Fe-56
- 4) U-235
- 5) U-238
- 6) Pu-239

Initially we assumed that these evaluations are now fairly well known, so if we compared the CIELO data to a currently available library, such as ENDF/B-VII.1, we would find only minor differences. In order to illustrate this we assumed it would only be necessary for me to quickly compare major cross sections: Total, Elastic, Fission and Capture.

Our results showed how wrong we were in my initial assumption, because our comparisons actually show rather large differences; much bigger differences than we assumed. Even though the results of our comparisons are not what we expected, we are informally distributing our results in the hope that readers, particularly evaluators, find them useful.

**Please Don't Shoot the Messenger**

Here we will not make any judgment as to which evaluation is better or worse. As in many things in life often "Beauty is in the eye of the beholder.", so we will leave all judgment up to you, the reader, in particular we leave it to the evaluators reading this to insure they understand the differences.

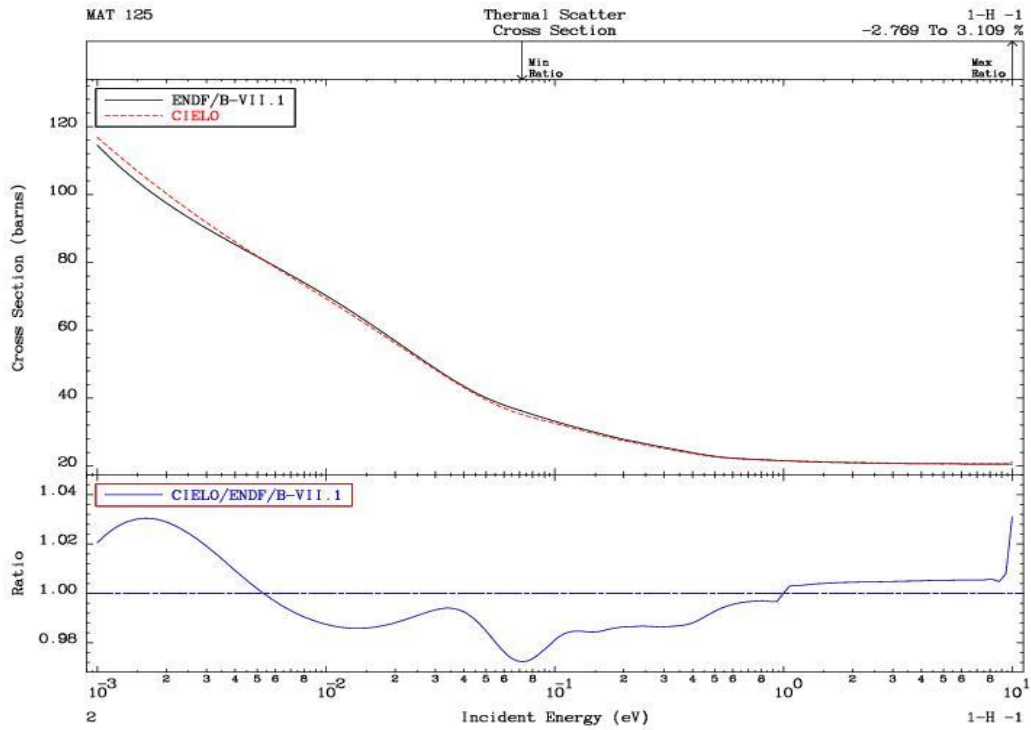
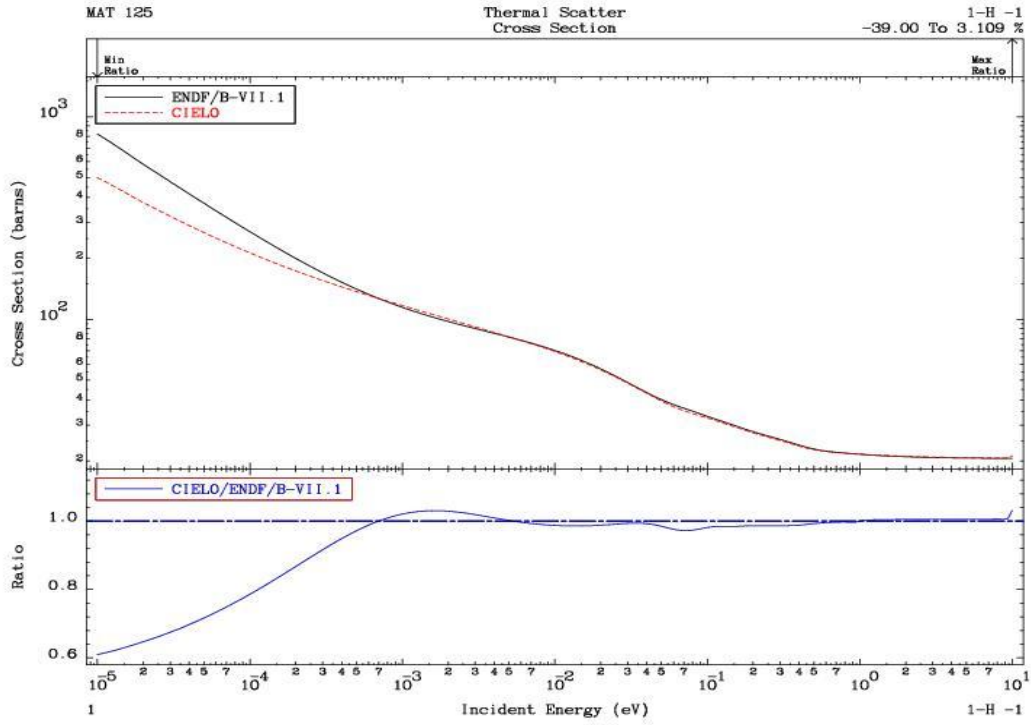
## Comparisons

Our comparisons are included below as a series of plots for all six isotopes. Here we compare room temperature (293.6 K) data for both CIELO and ENDF/B-VII.1. In 5 cases we started from the original evaluations and used the PREPRO2015 codes to create tabulated, room temperature cross sections; in the case of H in H<sub>2</sub>O we used NJOY to create tabulated, room temperature cross sections.

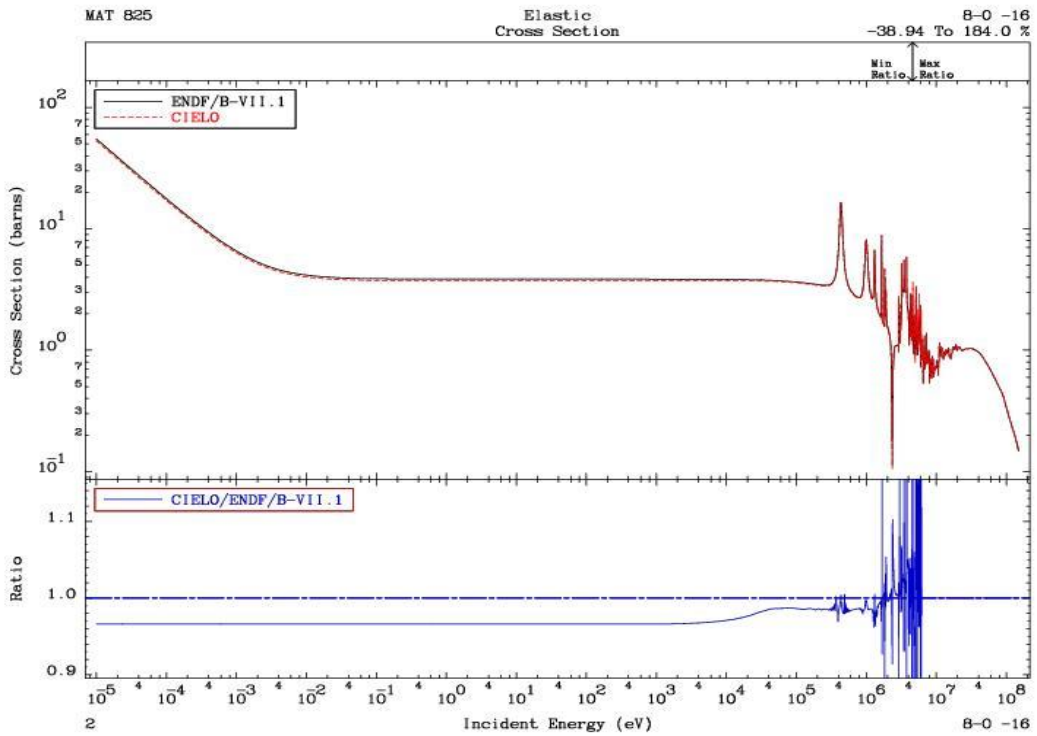
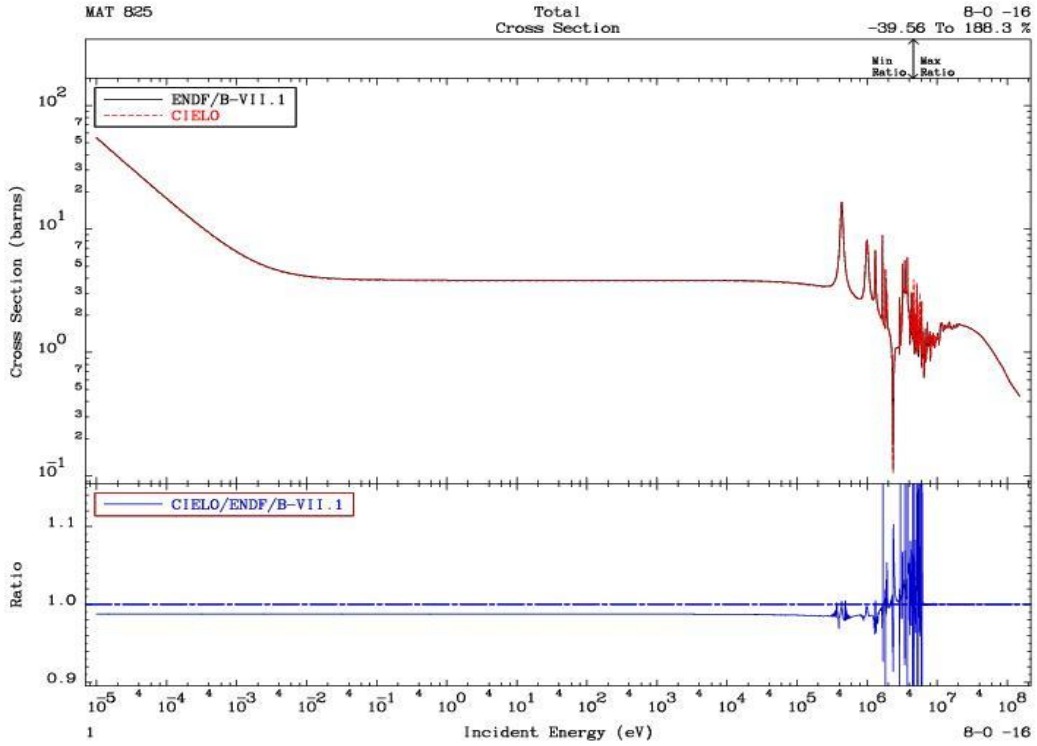
In summary we results show,

- 1) **H in H<sub>2</sub>O:** For thermal scatter at low (sub-thermal) energy we see large differences, up to 39% at 1.0e-5 eV. In the thermal range we see differences of a few per-cent.
- 2) **O-16:** For elastic a few per-cent changes at low energy, but large differences up to almost a factor of 3 (~200% differences) in the MeV range. No difference for capture.
- 3) **Fe-56:** For all of the reactions that we compared we found ENORMOUS differences over the entire energy range – here we am talking about factors of up to over 100 (10,000 %) differences. CIELO extends resolved range from 850 keV up to 2 MeV, but omits fluctuations in ENDF/B-VII.1 above 2 MeV. CIELO appears to correct ENDF/B-VII.1 capture above 400 keV.
- 4) **U-235:** No significant differences.
- 5) **U-238:** For elastic 6 to 8 % differences at in the unresolved and tabulated higher energy ranges. Minor differences in fission in the MeV range. No difference for capture.
- 6) **Pu-239:** For all of the reactions that we compared we found large differences. At low energy CIELO fission is 5% lower and capture is 10% higher; a big change in reactivity. In the resonance region we see differences of almost 2 (100%) due to different resonance parameters.

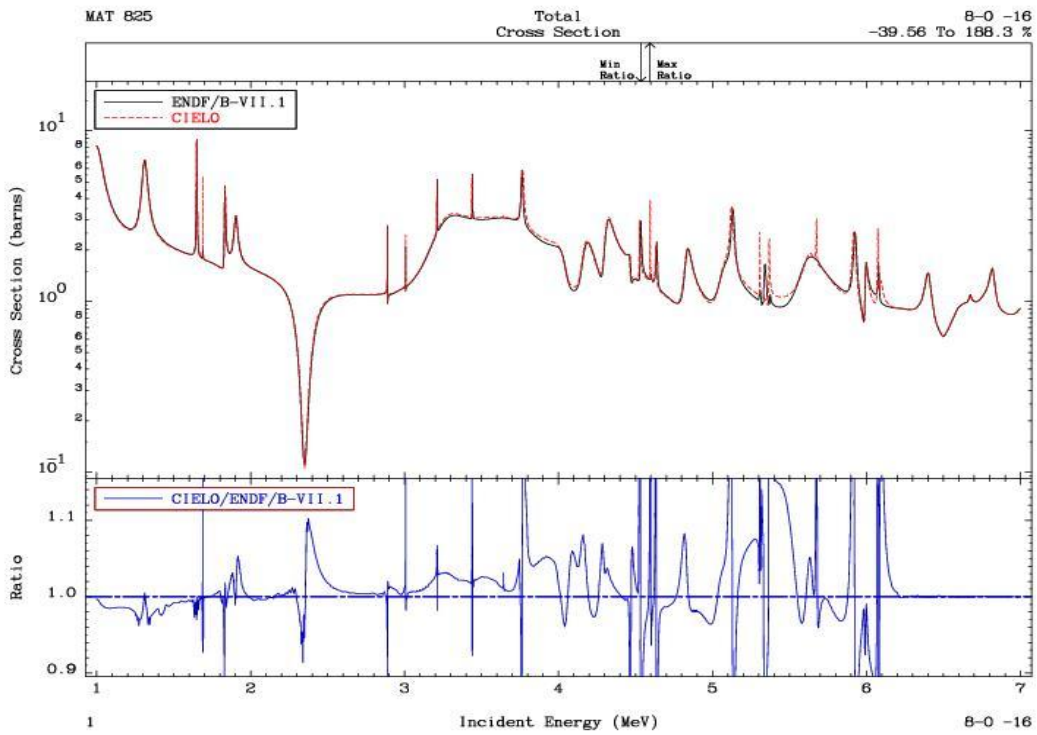
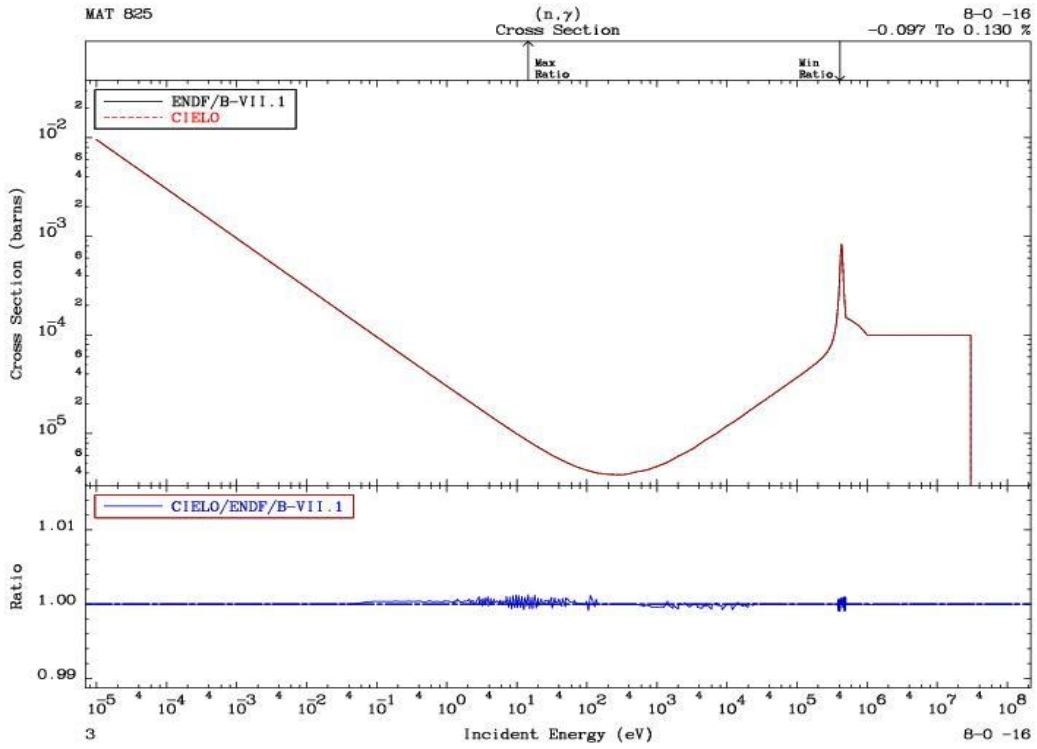
# H in H2O



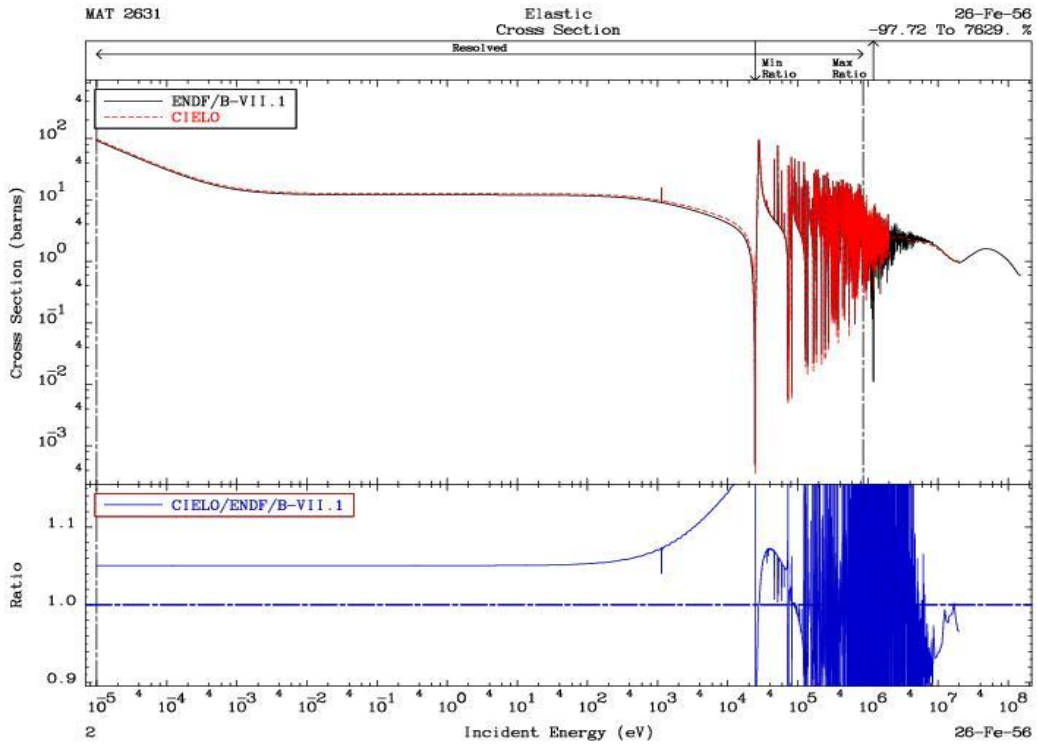
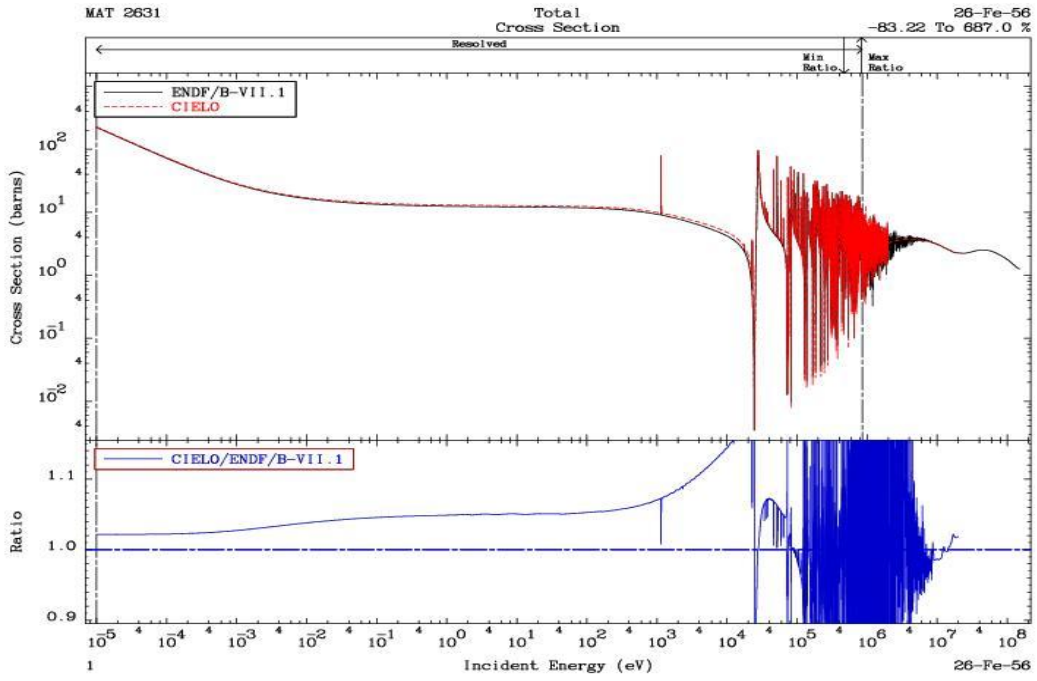
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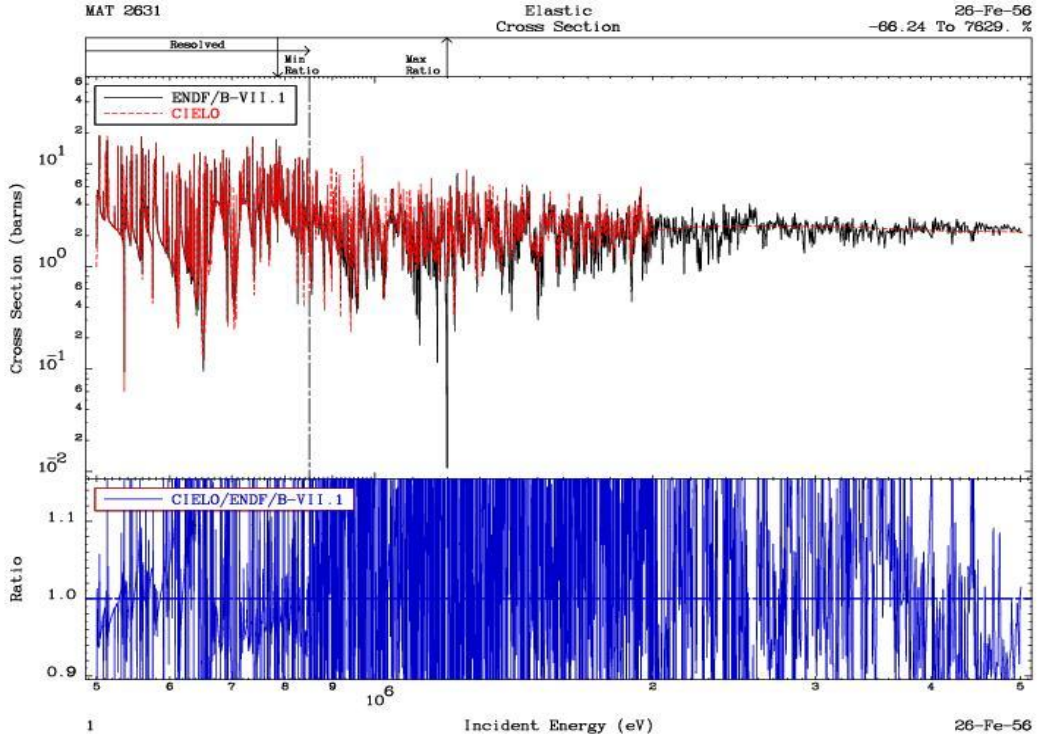
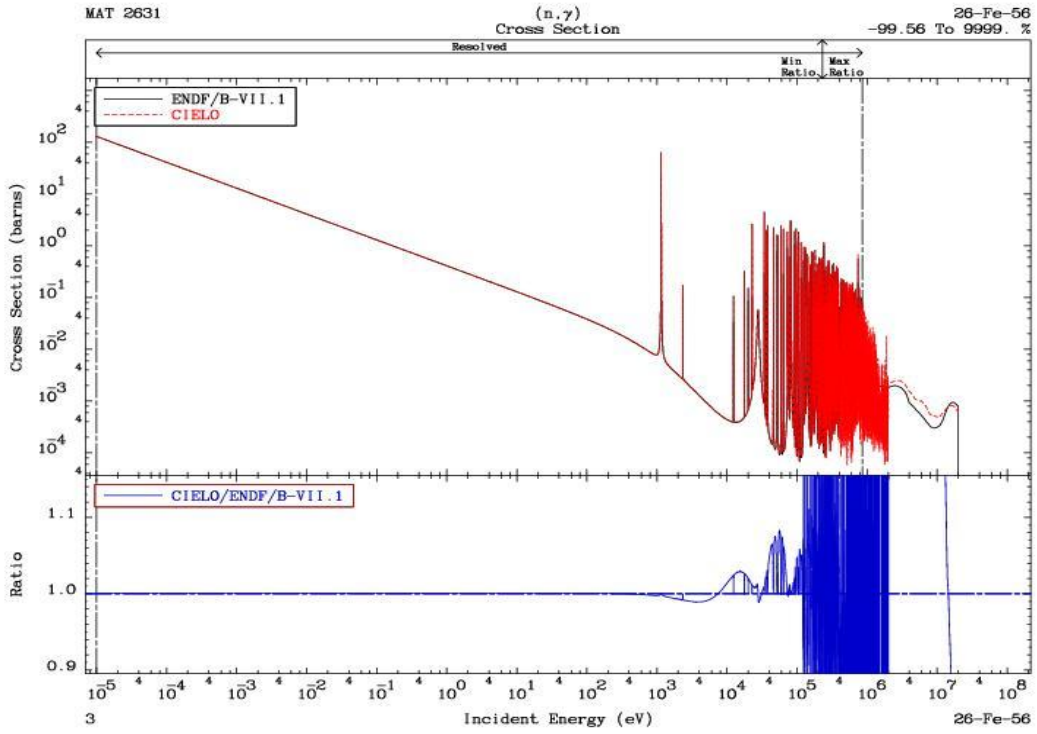
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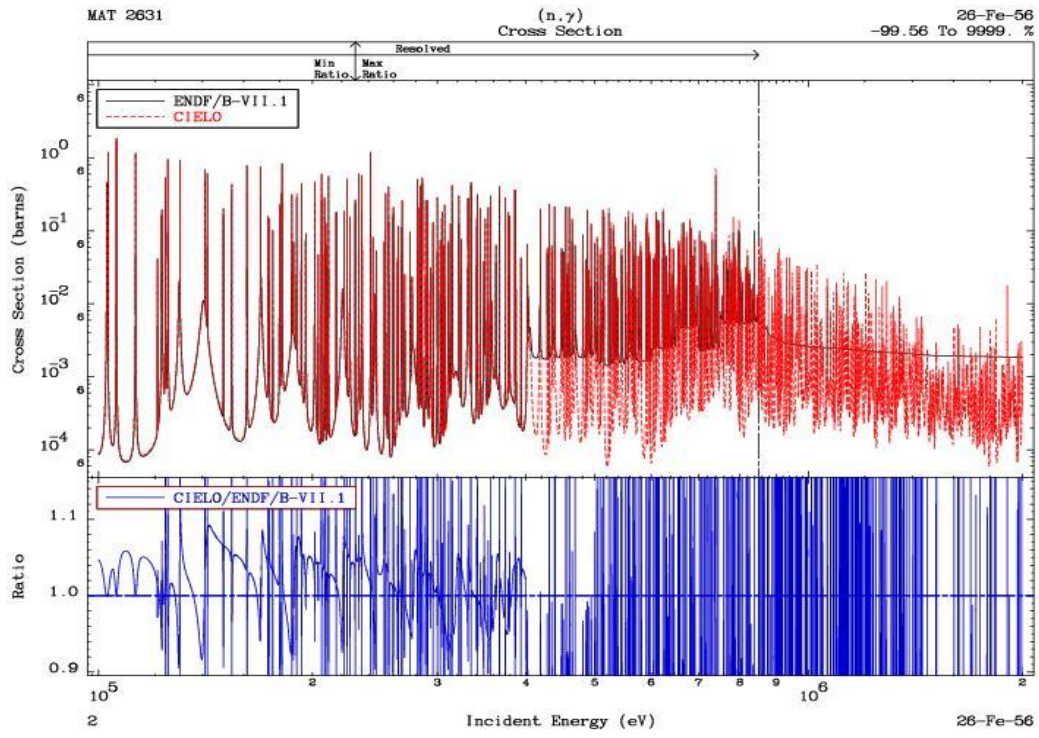
# Fe-56



# Fe-56

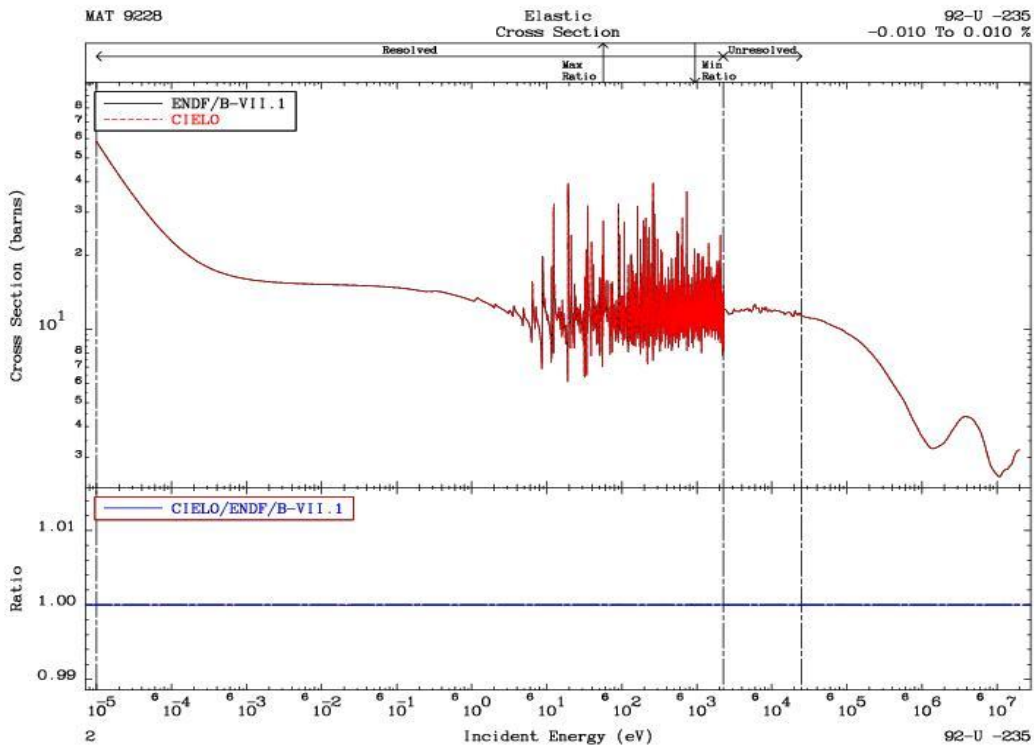
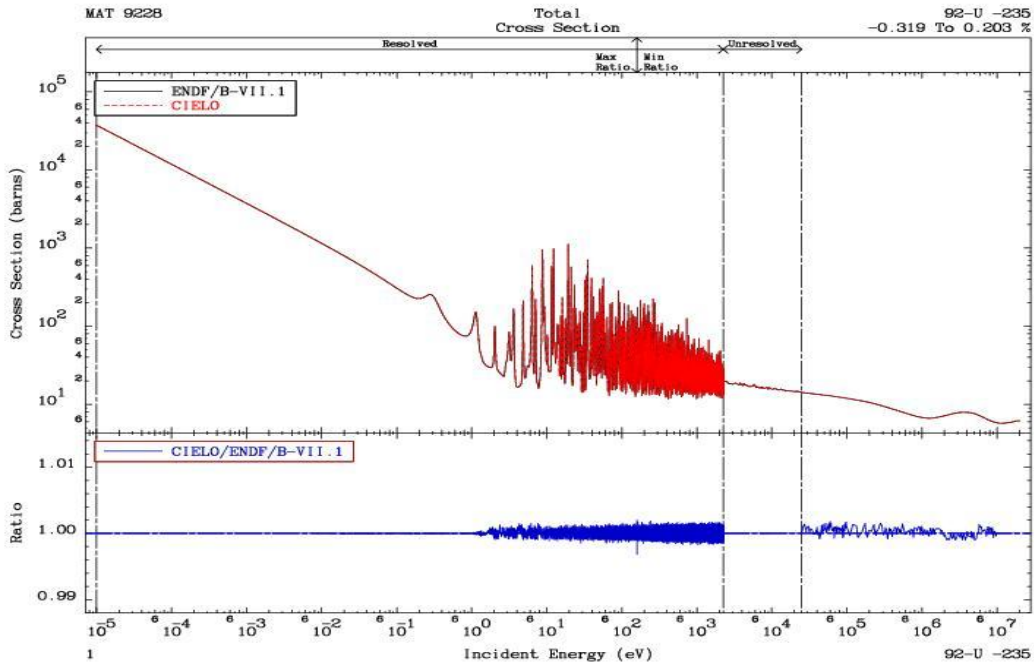


# Fe-56

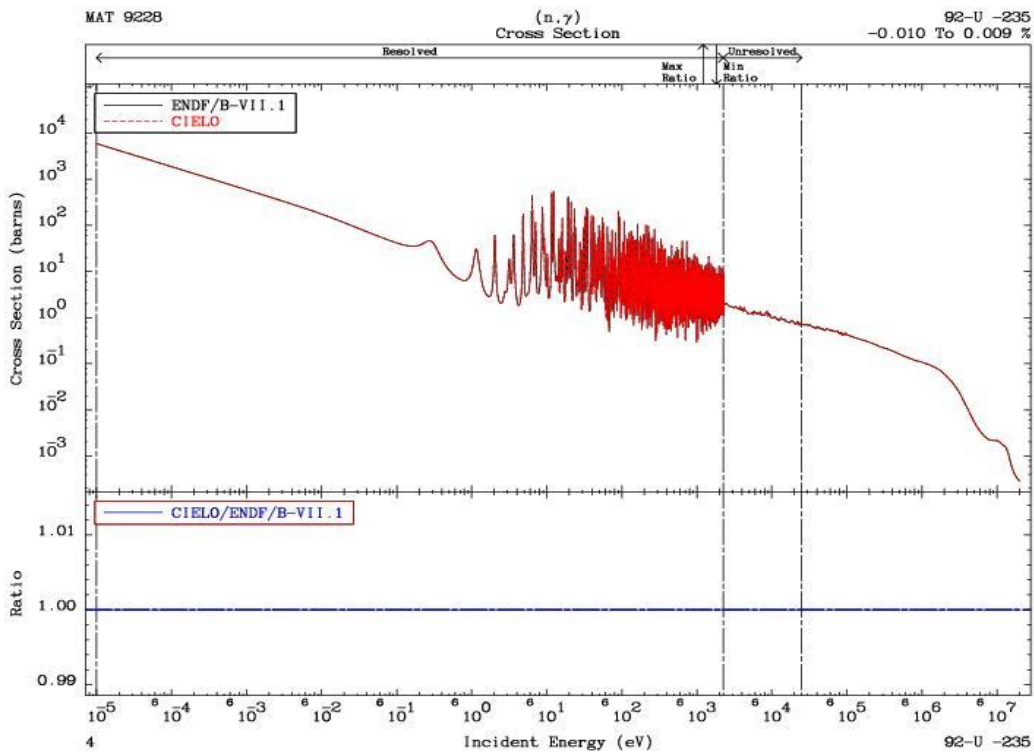
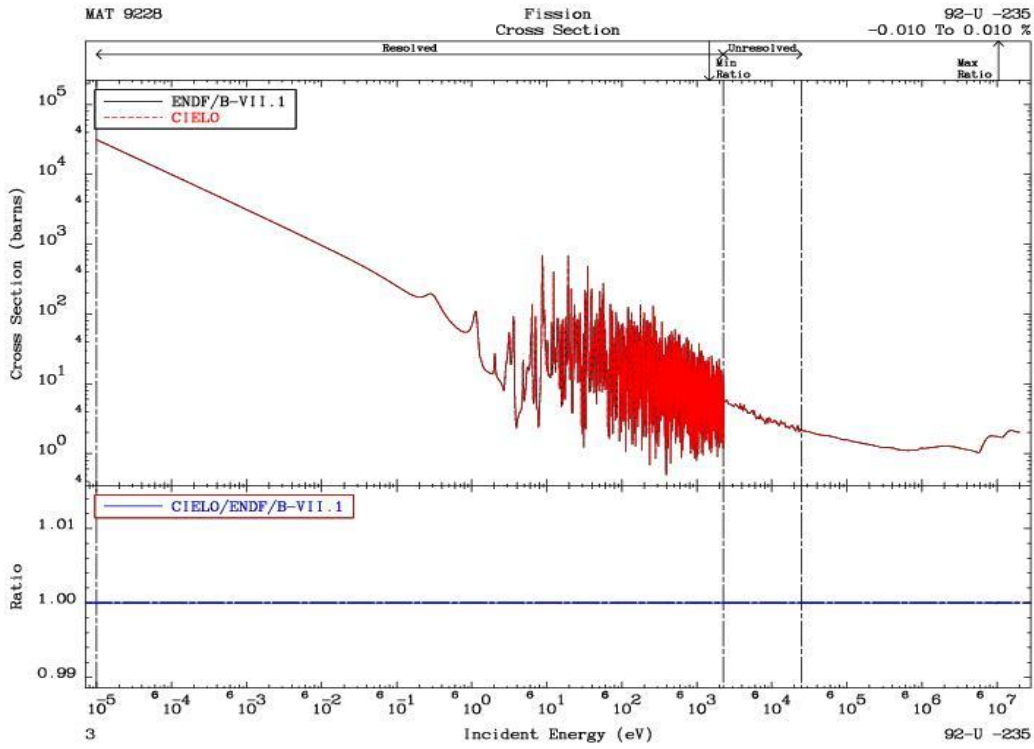




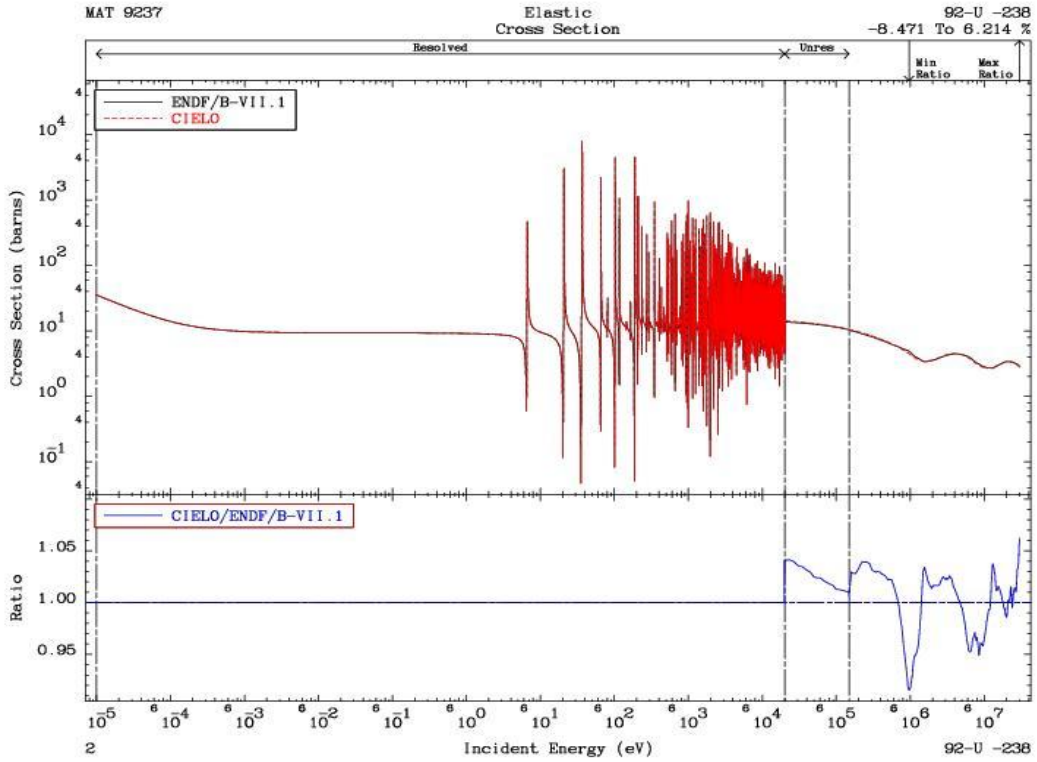
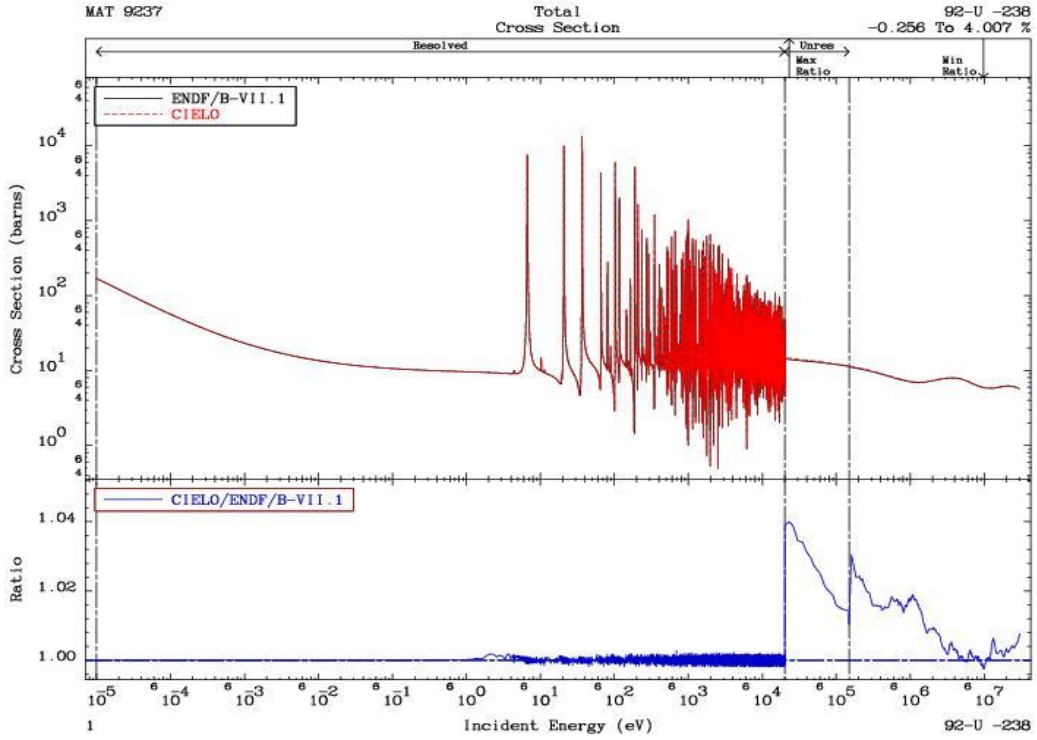
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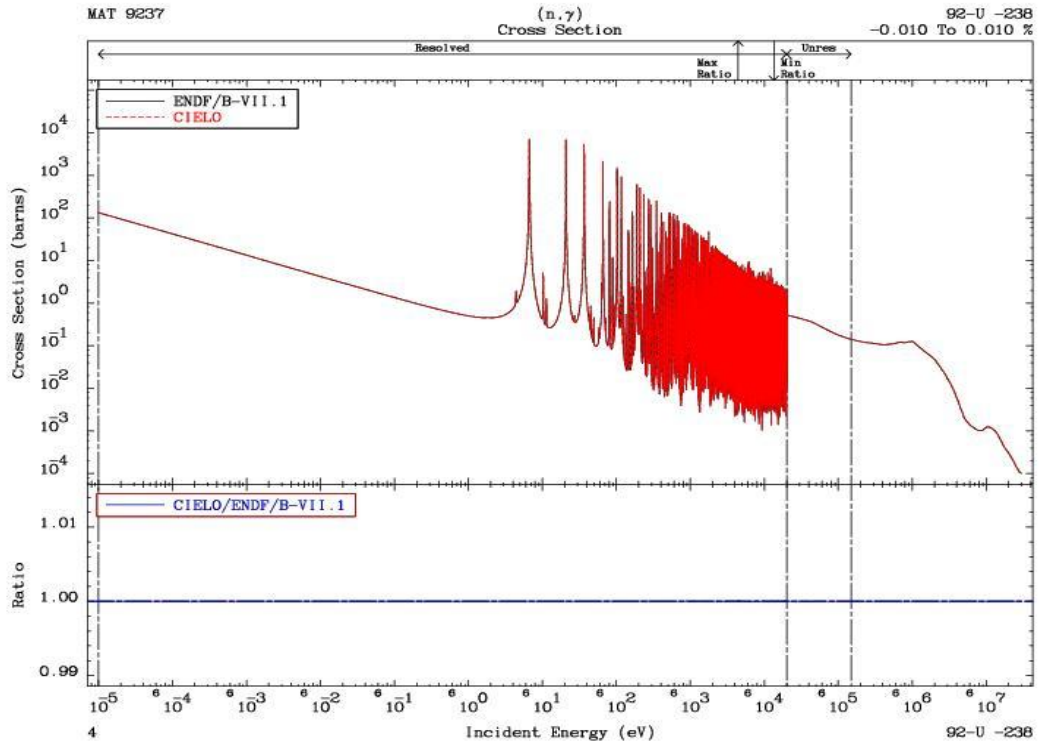
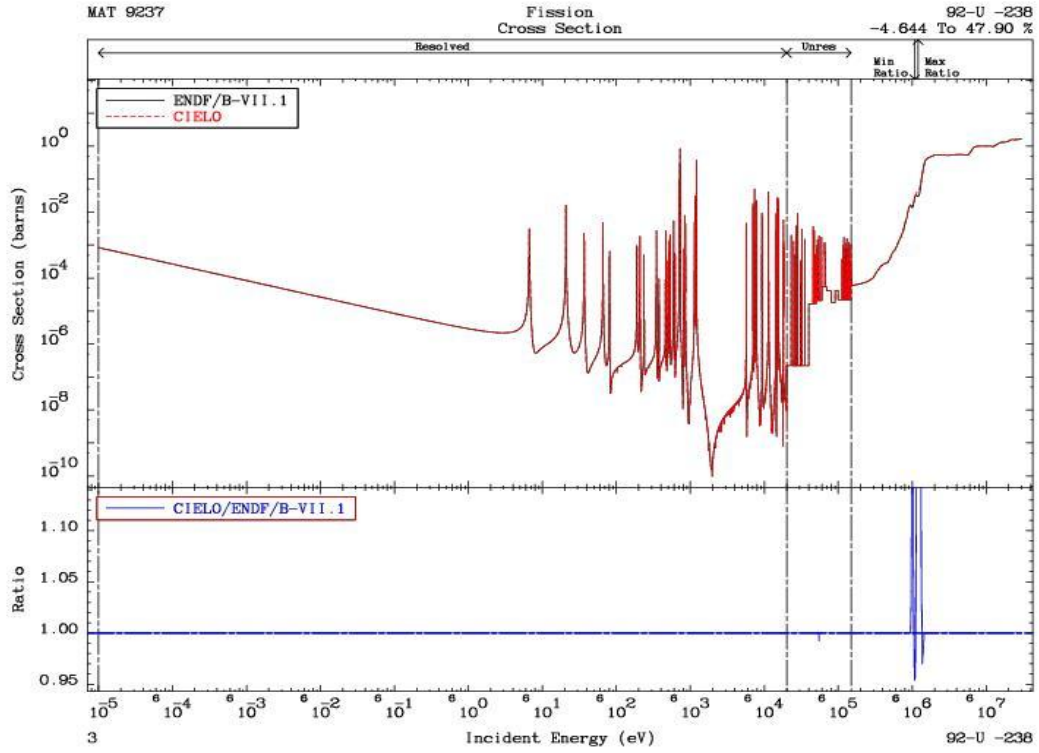
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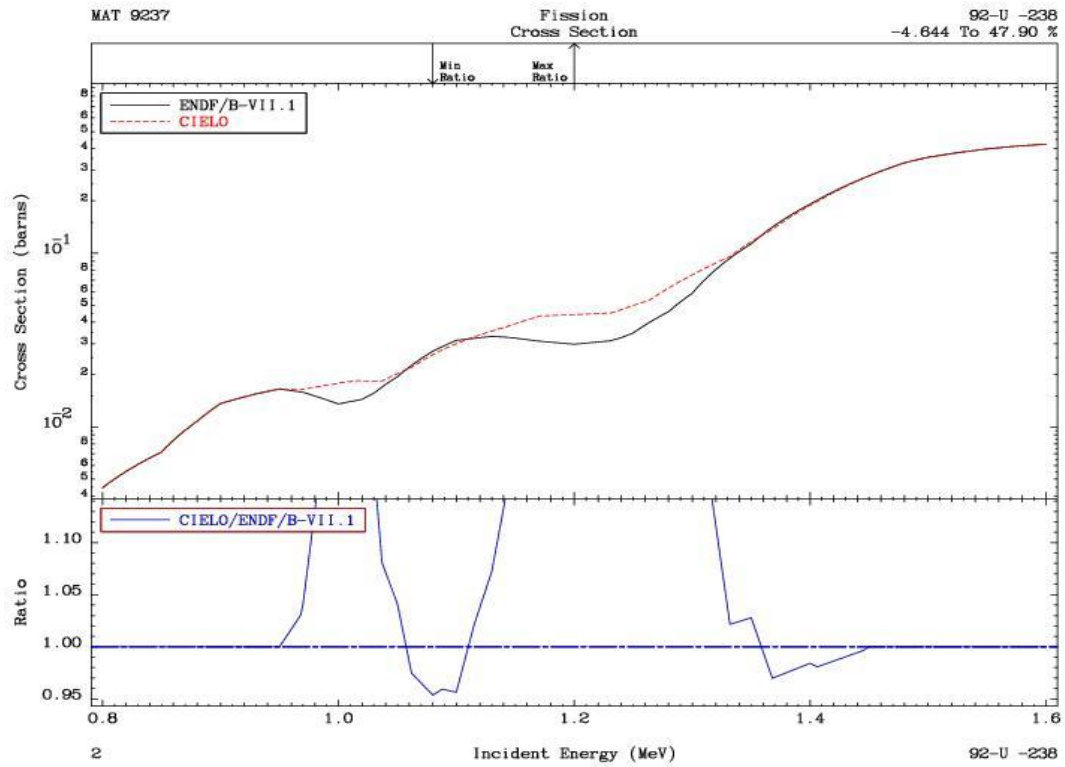
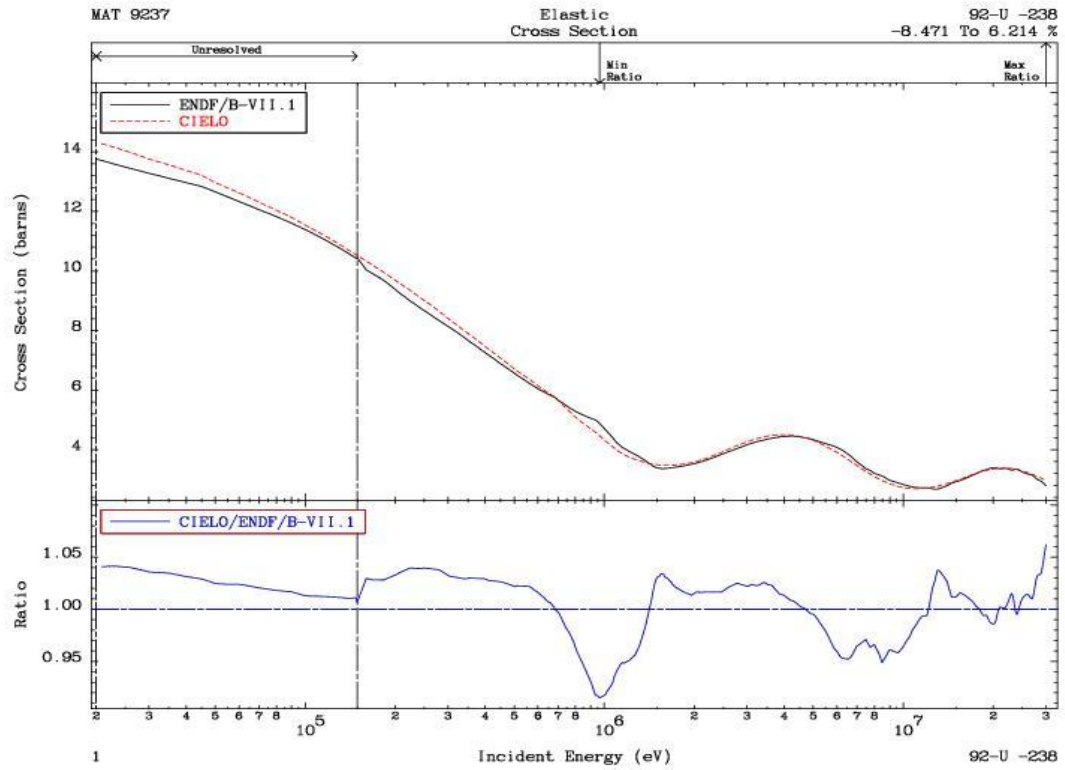
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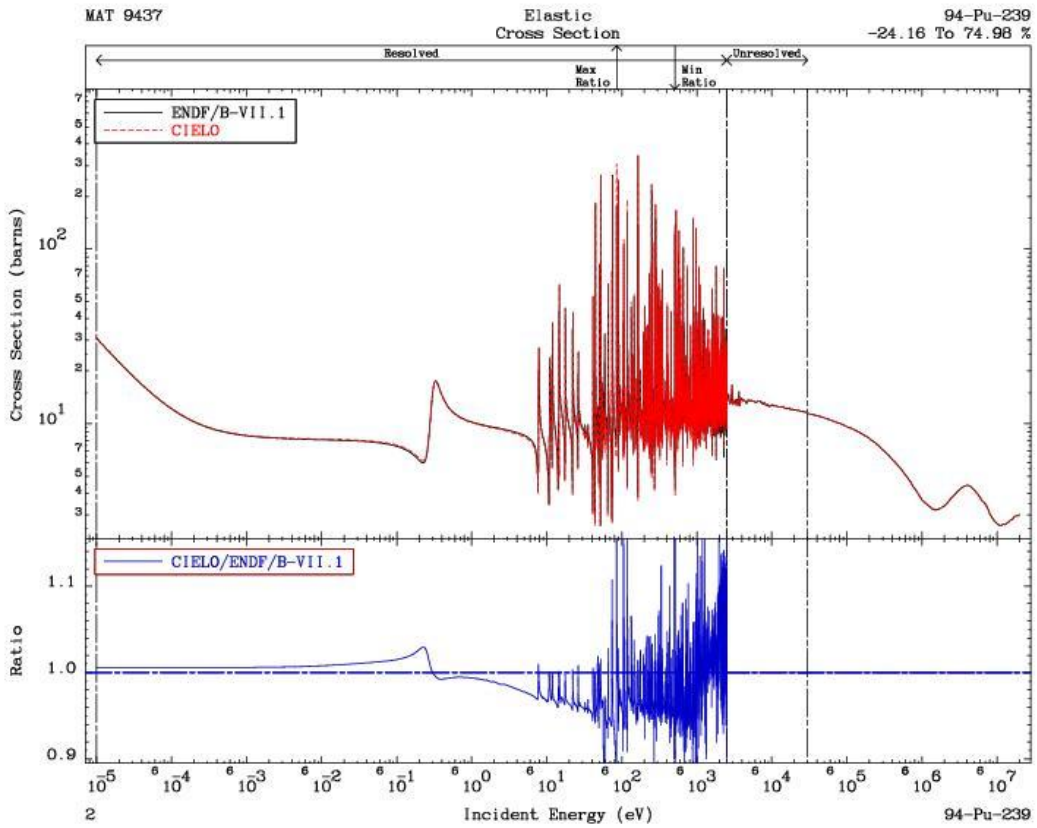
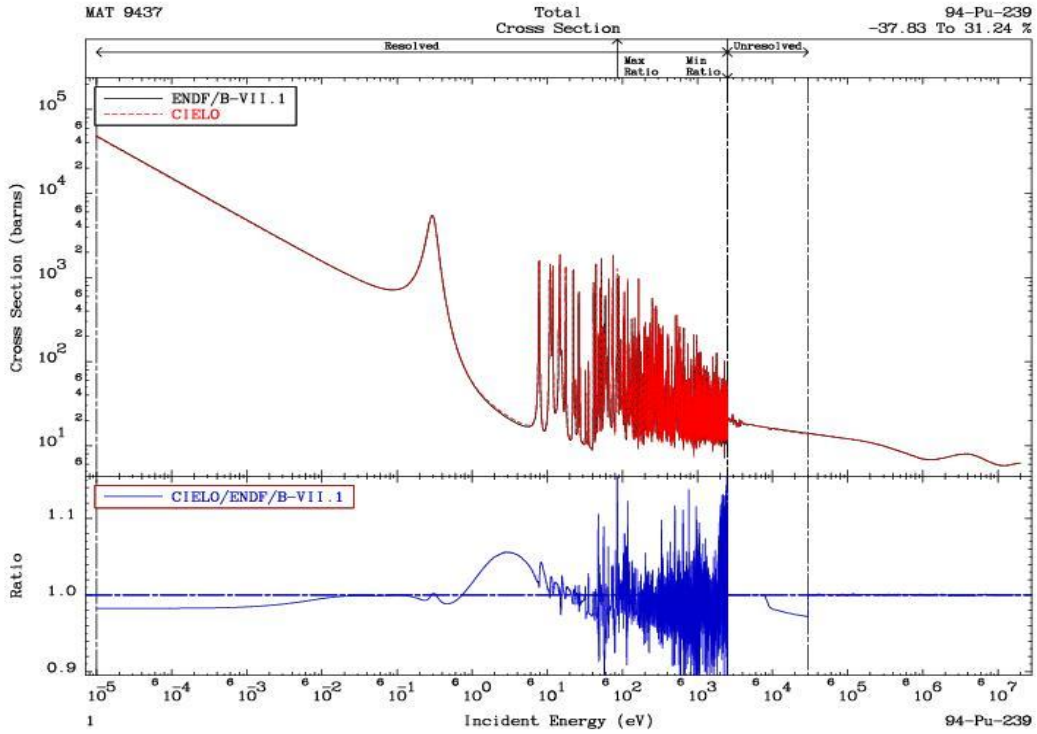
# U-238



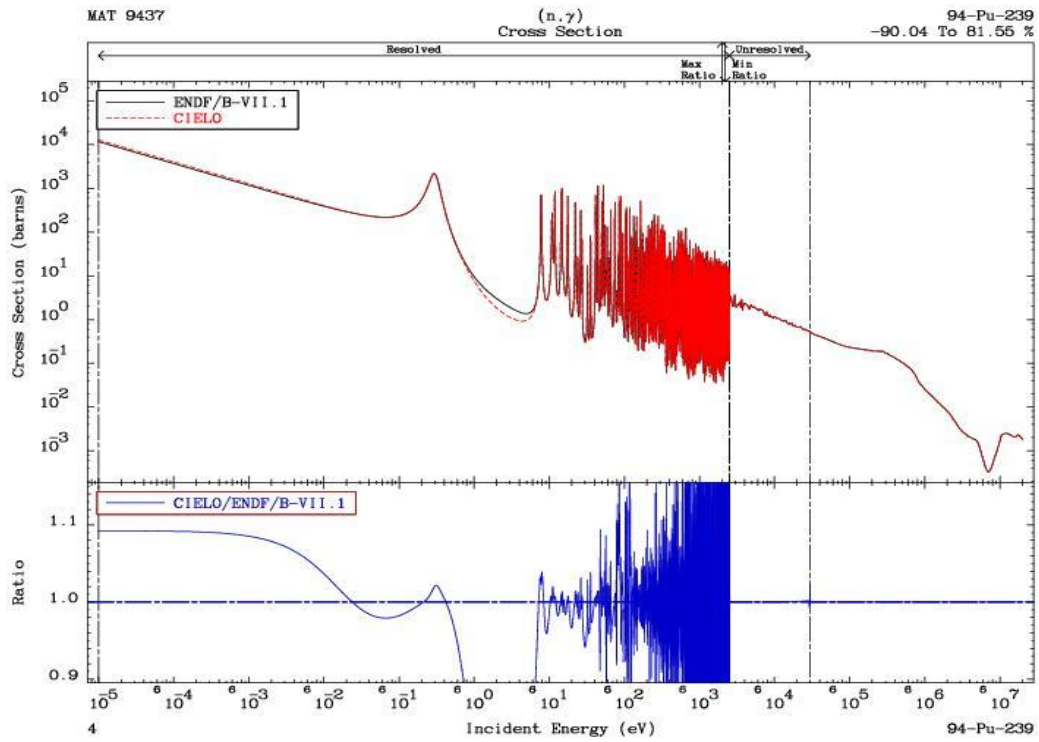
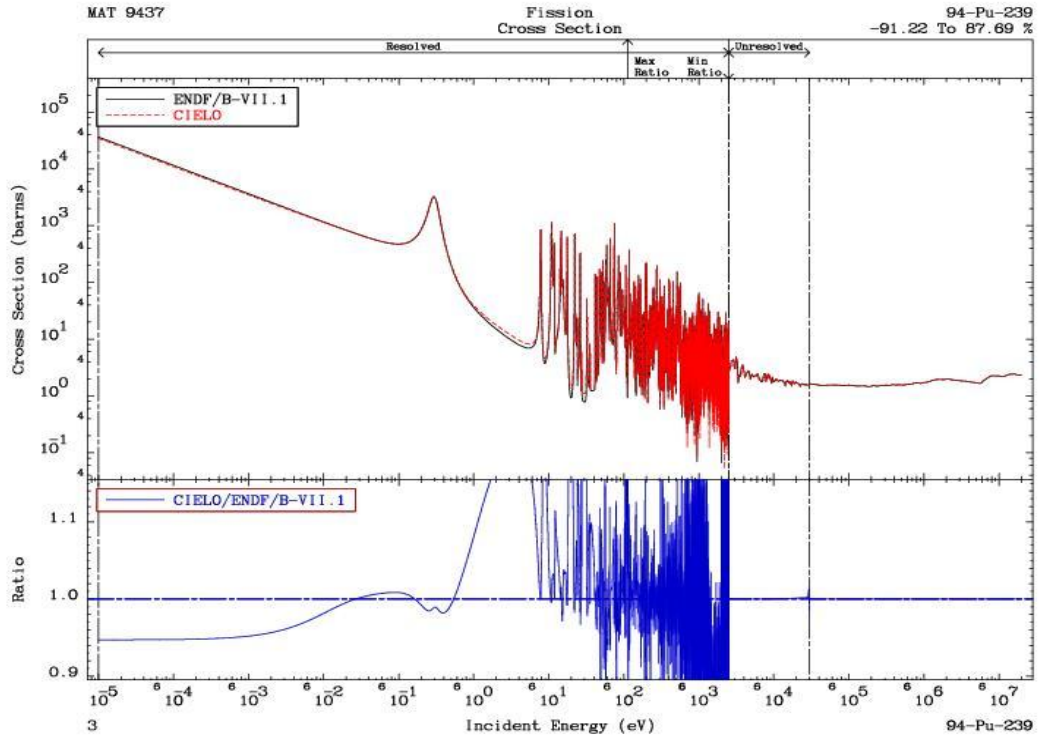
# U-238



# Pu-239



# Pu-239



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