

WPEC Subgroup 40 (CIELO)  
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Cierjacks 1968, Cierjacks 1980,  
and RPI 2015

C. R. Lubitz

clubitz@nycap.rr.com 1-518-383-6580 24/7

# 1. CI68 and CI80

- Cierjacks 1968 and 1980 measured the total cross section of liquid oxygen at the Karlsruhe synchrotron (NUC. INSTR. & METHODS 169 (1980) 185-198). Their resolution is unmatched and their 1980 energy scale is a calibration standard.
- In EXFOR CI68 covers 0.67-32 MeV; CI80 3.14-32 MeV. (Where did the low-energy CI80 go?)

## 2. CI68 and CI80

- The CI68 "thin-sample" data were not published. The 1980 "thick-sample" paper says that due to background problems they normalized CI80 to CI68 at 3.5 MeV. However, the EXFOR data are ***not normalized to each other.***
- In our NEMEA7 paper we reported a quadratic fit estimate of the EXFOR difference. The points in 3.4-3.6 MeV give 3.0491 barns at 3.5 MeV for CI68 and 2.9533 for CI80. The ratio is 1.0324, so CI68 is 3.24% above CI80.

### 3. CI68, CI80, and RPI15

- Based on a comparison of the CI68 peak height at 1 MeV with the unitarity-constrained heights in some evaluations we believed that CI68 was high and CI80 was right.
- In Danon's slides for this meeting he compares the areas under the RPI experiment with various evaluations and with CI80. He gives the latter ratio as 0.968, meaning the experiment is 3.2% above CI80.
- ***Since CI68 is 3.24% above CI80, RPI and CI68 agree to 0.04%.***

## 4. CI68, CI80, and RPI15

- Whether or not this is just another astounding numerical coincidence, close to the Doppler ratio 1.0315, a reasonable next step would be to synthesize an experimental data set:
  1. Multiply CI80 by 1.0324.
  2. Extend it down to 670 keV by attaching the low-energy tail of CI68 to it.
- We shouldn't need any other measured total cross section in that interval, unless we want to look at the window where E71 is 112 mb, CI68 103... leakier.

## 5. CI68, CI80, and RPI15

- We should check the 1 MeV peak height to see why CI68 is ~3% higher than the evaluations JENDL4.0, ORNL2000, ENDF60, ENDF71, and Kunieda. Ohkubo goes up to 935 keV, but no peak value.
- It would be interesting to look at the resonances that the CI80 team fit to their data.
- Paul Romano has left KAPL for Argonne so I'm looking for some international laboratory collaborators :-)

Thank you  
We are very far from

**THE END**