

CSEWG Meeting, 8-10 November 2005

Validation of Thermal Cross Sections
and Resonance Integrals of the
WPEC_SG-23 Library

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Benchmark

K_0 NAA Database contains independently measured integral parameters k_0 and Q_0 :

$$k_{0,a} = \frac{M_s \Theta_a P_a \sigma_{0,a}}{M_a \Theta_s P_s \sigma_{0,s}}$$

$$Q_0 = \frac{I_0}{\sigma_0}$$

Comparable quantities calculated from SG-23

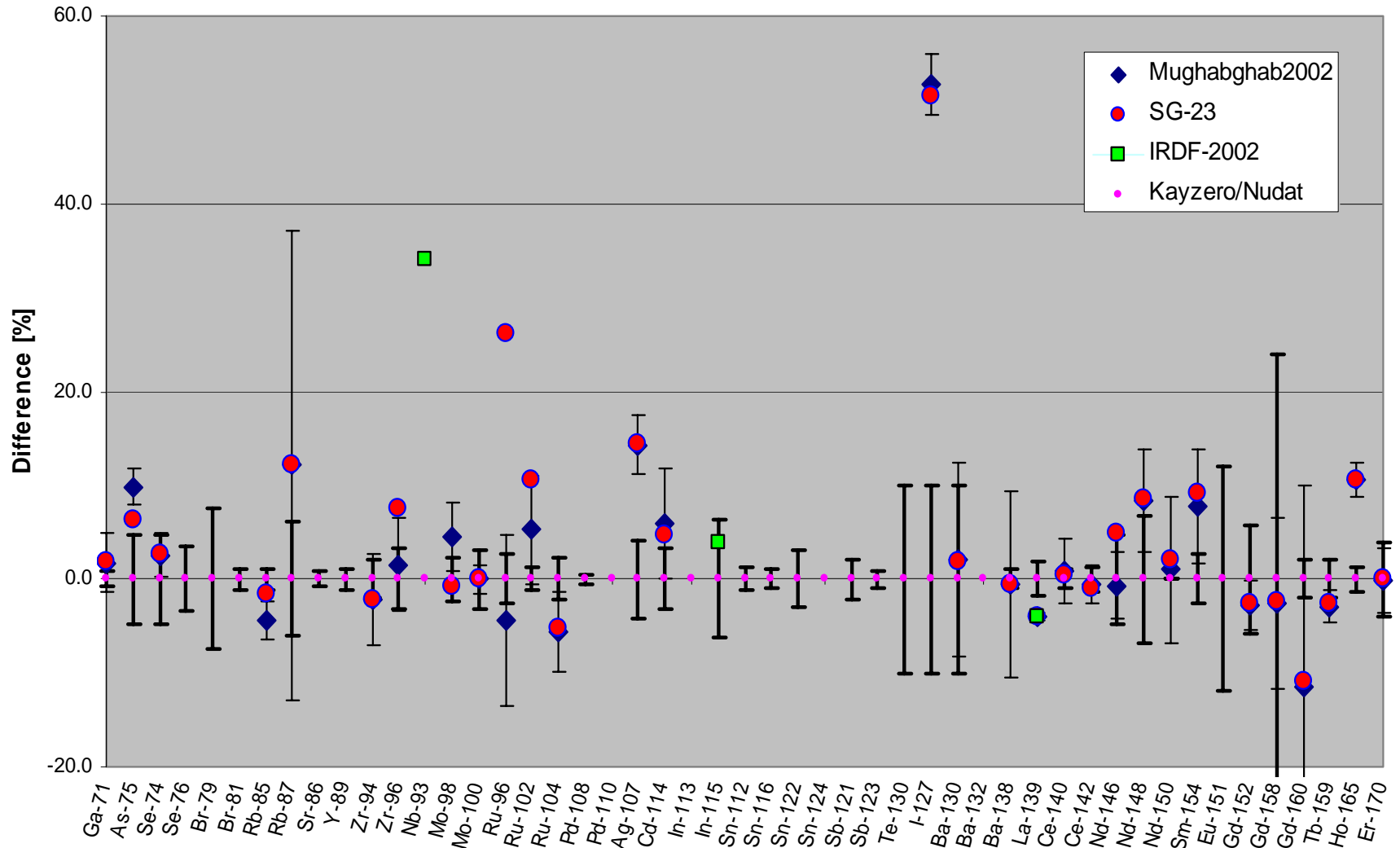


Comparison

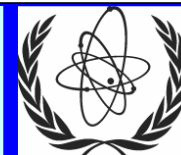
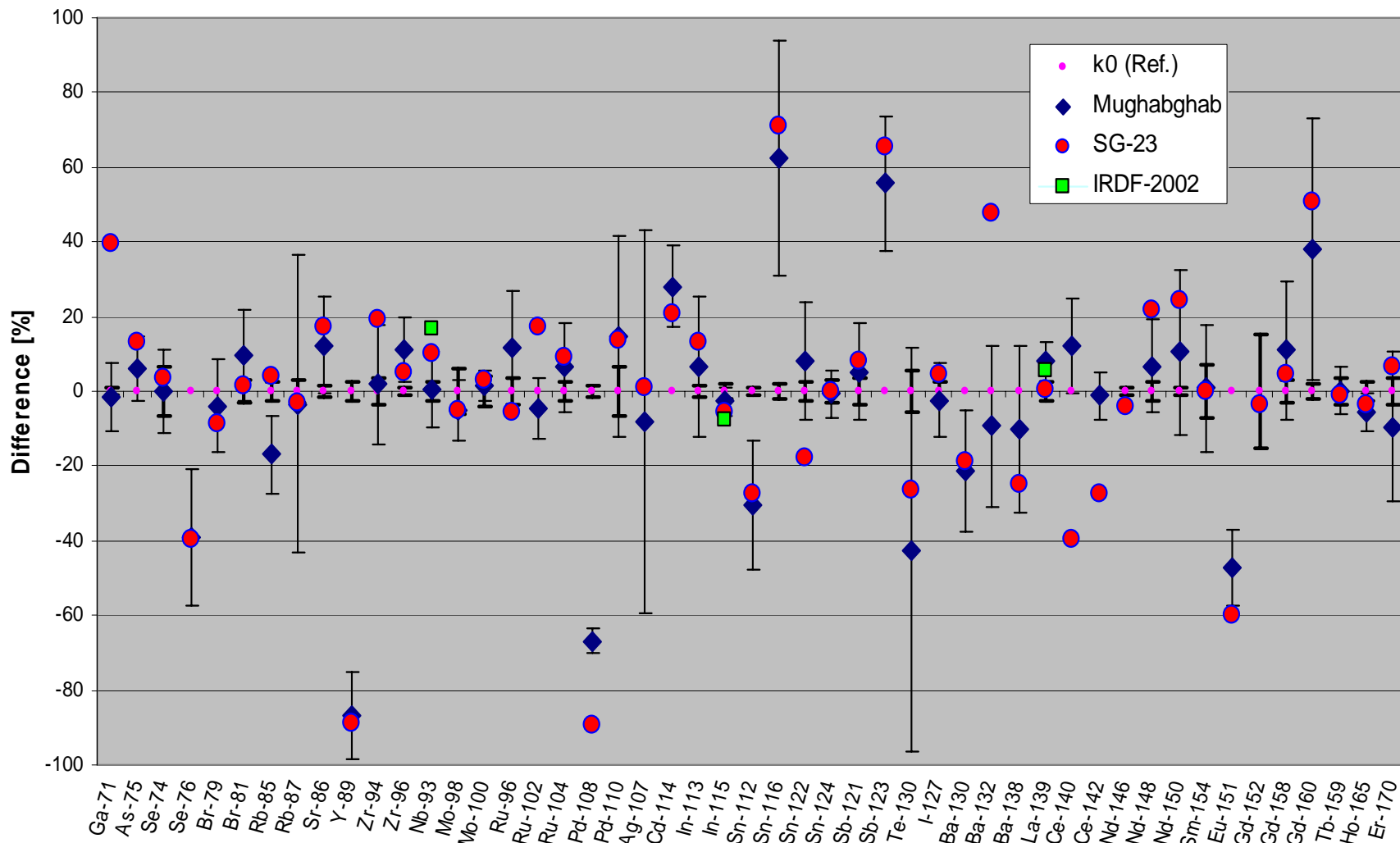
- 49 matching nuclides, some refer to formation of metastable states
 - Resonance integrals can be compared assuming constant branching ratios
- 30 nuclides involve total capture
 - Thermal cross sections can be compared, given gamma emission probabilities



Thermal Cross Sections



Ratio of Resonance Integral to thermal cross section



Conclusions

Thermal Cross Sections

- 2 nuclides $>20\%$ difference
- 5 nuclides $>10\%$ difference
- 5 nuclides $>5\%$ difference
- 18 nuclides agree to within quoted uncertainties

Ratio of resonance integral to thermal x-sec

- 17 nuclides $>20\%$ difference
- 8 nuclides $>10\%$ difference
- 8 nuclides $>5\%$ difference
- 6 nuclides $>$ quoted uncertainty
- 10 nuclides agree to within quoted uncertainties

