

Data assessment of $^{12}\text{C}(p,p)^{12}\text{C}$ cross sections from 3.5 to 5 MeV

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Summary

IBANDL reports only two databases for $^{12}\text{C}(p,p)$ differential cross sections in the energy region from 3.5 – 5 MeV. Tosaki data from original publication [1] were transferred to IBANDL without errors. Second database reported in IBANDL is from Jackson et al.[2]. They reported cross sections from 400 keV up to 4360 keV for several c.m scattering angles 169.2° , 148.9° , 127.8° and 106.4° that corresponds to 168.2° , 146.3° , 123.8° and 101.7° laboratory angles. Differential cross sections are reported only in graphical for and in center-of-mass system. IBANDL reports only data for 168.2° from ref. [2]. Data for three other angles (146.3° , 123.8° and 101.7°) need to be digitized and transferred to IBANDL.

I have found two other references not mentioned in IBANDL, which report differential cross sections in the 3.5 – 5.0 MeV energy region. First one is Reich et al. [3]. Authors report center-of-mass differential cross sections (barn/sr) at few different c.m. scattering angles. Only scattering angles larger than 100° are considered here. At the moment, data from [3] are not included to IBANDL. In the original publication they are presented only in the graphical form for following c.m. scattering angles: 125.2° , 140.5° , 131.2° , 137° , 149.3° , 164° that corresponds to 121° , 137.3° , 127.4° , 133.6° , 146.7° , 162.6° laboratory angles respectively.

Another recently published data set is from Caccioli et al. Their work is accepted for publishing in Nucl. Inst. And Meth. [4]. Authors from [4] report about proton elastic scattering cross-sections on F, C and Li from 3 to 7 MeV for 150° scattering angle. Data are presented only in graphical form. As one of co-authors is a member of this CRP group (M. Chiari) he will be asked to add those data to IBANDL.

As a conclusion, there are only four available publications about $^{12}\text{C}(p,p)$ scattering in the energy range from 3500 – 5000 keV. Available data from two old publications [2,3] are given only in the graphical form. Major part of those data is not included to IBANDL and should be digitized. Recent measurements performed at 150° are given in the paper accepted for publishing. As data are presented only in graphical form, authors will be asked to submit them to IBANDL.

Angle Lab	energy (keV)	Author	Comment
179.2°	4000-6000	M. Tosaki et al., Nucl. Instr. and Meth. B168 (2000) 543 Ref. [1]	Data in IBANDL are in agreement with data published in original publication
168.2°	400-4360	H.L. Jackson et al., Phys. Rev. 89 (1953) 365 Ref. [2]	Digitized data transferred to IBANDL
146.3°	400-4360	Ref. [2]	Need to be digitized Not included to IBANDL
123.8°	600-4360	Ref. [2]	Need to be digitized Not included to IBANDL
101.7°	600-4360	Ref. [2]	Need to be digitized Not included to IBANDL
121°	4100-5600	Reich et al., Phys. Rev. 104 (1956) 143 Ref. [3]	Need to be digitized Not included to IBANDL
137.3°	4100-5000	Ref. [3]	Need to be digitized Not included to IBANDL
127.4°	4600-5000	Ref. [3]	Need to be digitized Not included to IBANDL
133.6°	4600-5000	Ref. [3]	Need to be digitized Not included to IBANDL

146.7°	4100-5000	Ref. [3]	Need to be digitized Not included to IBANDL
162.6°	4800-5600	Ref. [3]	Need to be digitized Not included to IBANDL
150°	3000-7000	A. Cacioli et al. Ref. [4]	Not included to IBANDL

Table 1: Comparison between data from original publications and data published in IBANDL

References:

- [1] M. Tosaki et al., Nucl. Instr. and Meth. B168 (2000) 543
- [2] H.L. Jackson et al., Phys. Rev. 89 (1953) 365
- [3] Reich et al., Phys. Rev. 104 (1956) 143
- [4] A. Cacioli et al. accepted for publishing in Nucl. Instr. and Meth.