^{142}Nd(p,t) E=35.6 MeV 1996Po12

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 154, 1 (2018)	20-Nov-2018

98.3% ^{142}Nd, 500 μg/cm^2 target; excitation energy up to 4 MeV; measured t in focal plane of QMG/2 spectrograph (KVI) with energy resolution of 20-25 keV in angular range θ_{min}-θ_{max}=6°−58° with $\Delta\theta$=4°.

Extracted σ for each peak from area, thickness and solid angle (5 msr); weakest transitions of 2-3 μb/sr at maximum of angular distribution;

Measured p-elastic scattering for absolute σ normalization and compared to optical model calculations; obtained absolute σ normalization accuracy of 5-10% (better for relative σ).

Listed E_x, J^π, dσ/dΩ(10°) and dσ/dΩ(max) (at the main maximum; for 0° reported DWBA values). Uncertainties: in E_x, ≈2 keV below E_x=2.5 MeV, and increasing up to 5-7 keV at highest energies; in dσ/dΩ, statistical, and uncertainties of DWBA normalized to experimental; contaminants, possibly from other Nd isotopes, and Ba, Ce, Sm and Gd, more difficult to identify at high E_x.

Compared E_x, J^π assignments of this ref. to 1987Pe07; generally less reliable above 2 MeV because of increased uncertainty in E_x and higher level density.

^{140}Nd Levels

E(level)†	Jπ‡	dσ/dΩ(10°) μb/sr	Comments
0.0	0^+	574 *5*	dσ/dΩ(max)=700 *70* μb/sr.
774 *2*	2^+	829 *8*	dσ/dΩ(max)=1300 *65* μb/sr.
1414 *2*	2^+#	9.0 *8*	dσ/dΩ(max)=50 *15* μb/sr (corrected for two-step contributions).
1490 *2*	(2^+)	67 *2*	dσ/dΩ(max)=100 *10* μb/sr.
1802 *2*	4^+	201 *4*	dσ/dΩ(max)=250 *13* μb/sr.
1936 *2*	3^-	7.3 *7*	dσ/dΩ(max)=30 *9* μb/sr (corrected for two-step contributions).
2140 *2*	2^+	166 *3*	dσ/dΩ(max)=210 *11* μb/sr.
2224 *2*	7^-	48 *2*	dσ/dΩ(max)=115 *6* μb/sr.
2276 *2*	5^-	78 *2*	dσ/dΩ(max)=160 *16* μb/sr.
2336 *2*	2^+	77 *2*	dσ/dΩ(max)=120 *12* μb/sr.
2360 *2*	0^+	78 *2*	dσ/dΩ(max)=108 *16* μb/sr.
2400 *2*	4^+	44 *2*	dσ/dΩ(max)=55 *6* μb/sr.
2468 *2*	2^+	140 *3*	dσ/dΩ(max)=200 *10* μb/sr.
2514 *3*	5^-	3.0 *5*	dσ/dΩ(max)=3.3 *5* μb/sr.
2550 *3*	$(0)^+$	4.7 *6*	dσ/dΩ(max)=11.0 *17* μb/sr.
2575 *3*	$(4^+,5^-)$	1.7 *3*	dσ/dΩ(max)=3.3 *3* μb/sr.
2606 *3*	3^-	20.0 *15*	dσ/dΩ(max)=20 *1* μb/sr.
2686 *3*	4^+	61 *2*	dσ/dΩ(max)=90 *5* μb/sr.
2710 *3*	2^+	37 *2*	dσ/dΩ(max)=60 *9* μb/sr.
2830 *3*	(2^+)	123 *3*	dσ/dΩ(max)=122 *24* μb/sr.
2889 *3*	(5^-)	3.5 *7*	dσ/dΩ(max)=4.5 *7* μb/sr.
2911 *3*	0^+	32 *2*	dσ/dΩ(max)=50 *5* μb/sr.
2945 *3*	(6^+)	25.0 *15*	dσ/dΩ(max)=20 *4* μb/sr.
3014 *4*	4^+	88.0 *25*	dσ/dΩ(max)=125 *6* μb/sr.
3061 *4*	4^+@	19 *1*	dσ/dΩ(max)=28 *3* μb/sr.
3136 *4*	(4^+)	30.0 *15*	dσ/dΩ(max)=30 *6* μb/sr.
3206 *4*	(2^+)	66 *2*	dσ/dΩ(max)=90 *9* μb/sr.
3239 *4*	(2^+)	18.0 *15*	dσ/dΩ(max)=40 *6* μb/sr.
3286 *4*	4^+	18.0 *15*	dσ/dΩ(max)=30 *3* μb/sr.
3324 *4*	2^+&4^+	59 *2*	dσ/dΩ(max)=40 *8* + 30 *6* μb/sr.
3387 *4*	2^+	48 *2*	dσ/dΩ(max)=80 *12* μb/sr.
3460 *5*	4^+	14.0 *11*	dσ/dΩ(max)=16 *2* μb/sr.
3494 *5*	4^+	15.0 *12*	dσ/dΩ(max)=16 *3* μb/sr.
3510 *5*		8 *1*	dσ/dΩ(max)=8.0 *14* μb/sr.
3561 *5*	(2^+)	38.0 *17*	dσ/dΩ(max)=60 *9* μb/sr.

Continued on next page (footnotes at end of table)

^{142}Nd(p,t) E=35.6 MeV 1996Po12 (continued)

^{140}Nd Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	dσ/dΩ(10°) μb/sr	Comments
3574 *5*	3$^-$	21.0 *14*	dσ/dΩ(max)=26 *3* μb/sr.
3621 *5*	(4$^+$)	7.2 *1*	dσ/dΩ(max)=12 *2* μb/sr.
3666 *5*	(7$^-$)	7 *1*	dσ/dΩ(max)=16 *2* μb/sr.
3733 *6*		18 *1*	dσ/dΩ(max)=15 *3* μb/sr.
3755 *6*	6$^+$	7.8 *1*	dσ/dΩ(max)=20 *2* μb/sr.
3810 *6*		12.0 *13*	dσ/dΩ(max)=20 *4* μb/sr.
3844 *6*	(6$^+$)	5 *1*	dσ/dΩ(max)=7.0 *15* μb/sr.
3889 *6*	(1$^-$)	21 *1*	dσ/dΩ(max)=45 *5* μb/sr.
3925 *7*		6.8 *1*	dσ/dΩ(max)=7.0 *14* μb/sr.
3949 *7*		2.0 *14*	dσ/dΩ(max)=6.0 *12* μb/sr.

[†] ΔE(level): added by evaluator based on statement of 1996Po12 (see general comment, uncertainties in E$_x$); above E$_x$=2500 keV some arbitrariness is unavoidable.
[‡] Assignments from comparison of experimental dσ/dΩ and DWBA calculations (zero-range approximation) (1996Po12).
[#] 1996Po12 compared this level to level E$_x$=1413.2 keV, $J^{\pi}=0^+$ from 1987Pe07.
[@] 1996Po12 compared this level to level E$_x$=3061.8 keV, $J^{\pi}=7^-$ from 1987Pe07.