

¹⁴⁸Nd(α ,t) 1976St10

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen		NDS 185, 2 (2022)	23-Aug-2022

1976St10: E(α)=27 MeV from the McMaster University Tandem. Enriched 95.4% ¹⁴⁸Nd target on carbon foils. The tritons were analyzed with magnetic spectrograph. $\sigma(\theta)$ data at two angles were measured.

¹⁴⁹Pm Levels

Cross sections listed under comments are from **1976St10**.

E(level)	L [†]	S [‡]	Comments
0	(4,5)	2.6	S: for L=4.
114 4	2	2.5	d σ /d Ω (μ b/sr)=108 at 60°, 146 at 40°.
187 4	2,3,4	0.033	d σ /d Ω (μ b/sr)=171 at 60°, 209 at 40°. d σ /d Ω (μ b/sr)=2 at 60°, \approx 3 at 40°. L: adopted $J^\pi=3/2^+$ consistent with L=2 only.
211 4	(0)	0.033	S: for L=2. d σ /d Ω (μ b/sr)=2 at 60°, \approx 3 at 40°. L: adopted $J^\pi=5/2^+$ requires L=2.
240 4	5	3.9	S: for L=2. d σ /d Ω (μ b/sr)=147 at 60°, 281 at 40°.
271 4	(2)	0.18	d σ /d Ω (μ b/sr)=20 at 60°, 20 at 40°. L: adopted $J^\pi=7/2^-$ requires L=3.
387 4	0	0.23	S: for L=3. d σ /d Ω (μ b/sr)=19 at 60°, 12 at 40°.
414 4	2	0.85	d σ /d Ω (μ b/sr)=56 at 60°, 62 at 40°.
515 4			d σ /d Ω (μ b/sr)=6 at 60°, 7 at 40°.
550 4	4,5	0.21	d σ /d Ω (μ b/sr)=12 at 60°, 7 at 40°. L: adopted $J^\pi=(11/2^-)$ favors L=5.
637 4	0,2	0.11	S: for L=5. d σ /d Ω (μ b/sr)=8 at 60°, \approx 4 at 40°. L: adopted $J^\pi=1/2^+$ consistent with L=0.
722 4			S: for L=0. d σ /d Ω (μ b/sr)=6 at 60°, \approx 4 at 40°.
751 4	2	0.55	d σ /d Ω (μ b/sr)=33 at 60°, 33 at 40°.
791 4	4,5	0.89	d σ /d Ω (μ b/sr)=29 at 60°, 46 at 40°. L: adopted $J^\pi=11/2^-$ consistent with L=5.
871 4	2,3	0.48	S: for L=4. d σ /d Ω (μ b/sr)=27 at 60°, 26 at 40°. L: 3 is inconsistent with $\sigma(\theta)$ in (³ He,d).
907 4	0	0.15	S: for L=2. d σ /d Ω (μ b/sr)=12 at 60°, \approx 4 at 40°.
959 4			d σ /d Ω (μ b/sr)=6 at 60°, \approx 3 at 40°.
1034 4	(5)	0.73	d σ /d Ω (μ b/sr)=22 at 60°, 38 at 40°. L: adopted $J^\pi=(7/2^+)$ requires L=4.
1139 4	2	0.12	d σ /d Ω (μ b/sr)=4 at 60°, 5 at 40°.
1181 4	2	0.14	d σ /d Ω (μ b/sr)=4 at 60°, 6 at 40°.
1192 4			d σ /d Ω (μ b/sr)=7 at 60°, 6 at 40°.
1215 4			d σ /d Ω (μ b/sr) \approx 4 at 60°.
1258 4	2,3		d σ /d Ω (μ b/sr)=6 at 60°, 8 at 40°.
1327 4			d σ /d Ω (μ b/sr)=3 at 60°, 4 at 40°.
1405 4	5	0.51	d σ /d Ω (μ b/sr)=14 at 60°, 23 at 40°.
1461 4	4,5		d σ /d Ω (μ b/sr)=12 at 60°, 19 at 40°.
1531 4	3	0.11	d σ /d Ω (μ b/sr)=4 at 60°, 7 at 40°.
1589 4	4,5	0.50	d σ /d Ω (μ b/sr)=12 at 60°, \approx 13 at 40°.

Continued on next page (footnotes at end of table)

$^{148}\text{Nd}(\alpha,t)$ 1976St10 (continued) ^{149}Pm Levels (continued)

<u>E(level)</u>	<u>L[†]</u>	<u>S[‡]</u>	<u>Comments</u>
			L: 5 is inconsistent with $\sigma(\theta)$ in ($^3\text{He},d$).
			S: for L=4.
1640 4	2	0.33	$d\sigma/d\Omega$ ($\mu\text{b}/\text{sr}$)=11 at 60° .
1697 4	2,3	0.20	$d\sigma/d\Omega$ ($\mu\text{b}/\text{sr}$)=6 at 60° .
			L: 3 is inconsistent with $\sigma(\theta)$ in ($^3\text{He},d$).
			S: for L=2.
1764 4	0		$d\sigma/d\Omega$ ($\mu\text{b}/\text{sr}$)<2 at 60° .
1782 4			$d\sigma/d\Omega$ ($\mu\text{b}/\text{sr}$)=4 at 60° .

[†] As indicated by $\sigma(\alpha,t)/\sigma(^3\text{He},d)$ ratios given in figure 7 by 1976St10. The actual L-values assigned by 1976St10 differ in some cases since $\sigma(\theta)$ results in ($^3\text{He},d$) are also used.

[‡] $\sigma(\text{exp})/(N \times \sigma(\text{theory}))$. $\sigma(\text{theory})$ is derived from DWBA calculation with $N=111$. Relative and absolute cross sections are accurate to 15% and 30%, respectively. 1976St10 also give adopted values derived from (α,t) and ($^3\text{He},d$) reactions.