^{148}Nd(^{3}He,d) 1976St10

History

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

1976St10: E(^{3}He)=24 MeV from the McMaster University Tandem. Enriched 95.40% ^{148}Nd deposited on 30 μg/cm^{2} carbon foils. Deuterons analyzed with a magnetic spectrograph. $\sigma(\theta)$ were measured at eight angles. dσ/dΩ (μb/sr) values at 45° and 60° are listed by 1976St10. These values are given under comments.

^{149}Pm Levels

E(level)	L[†]	S[‡]	Comments
0 *4*	4	1.8	dσ/dΩ (μb/sr)=35 at 60°, 40 at 45°. L: $\sigma(\alpha$,t)/σ(^{3}He,d) gives L=5.
114 *4*	2	2.2	dσ/dΩ (μb/sr)=146 at 60°, 236 at 45°.
190 *4*	2,3,4[#]	0.043	dσ/dΩ (μb/sr)=3 at 60°, ≈2 at 45°. L: L=3,4 are not consistent with adopted J^{π}=3/2^{+}. S: for L=2.
214 *4*		0.084	dσ/dΩ (μb/sr)=6 at 60°, 6 at 45°.
240 *4*	5	4.8	dσ/dΩ (μb/sr)=62 at 60°, 74 at 45°.
270 *4*	3	0.34	dσ/dΩ (μb/sr)=19 at 60°, 33 at 45°. L: $\sigma(\alpha$,t)/σ(^{3}He,d) gives L=2, inconsistent with (pol t,α).
387 *4*	0	0.32	dσ/dΩ (μb/sr)=38 at 60°, 61 at 45°.
414 *4*	2	0.71	dσ/dΩ (μb/sr)=50 at 60°, 91 at 45°.
461 *4*			dσ/dΩ (μb/sr)=3 at 60°, 5 at 45°.
514 *4*			dσ/dΩ (μb/sr)=4 at 60°. E(level): probably a combination of the 510.0 and 515.6 levels.
552 *4*	(5)[#]	0.39	dσ/dΩ (μb/sr)=5 at 60°, 5 at 45°.
636 *4*	0	0.090	dσ/dΩ (μb/sr)=14 at 60°, 23 at 45°.
721 *4*			dσ/dΩ (μb/sr)=5 at 60°.
749 *4*	2	0.49	dσ/dΩ (μb/sr)=42 at 60°, 63 at 45°.
787 *4*	(5)[#]	0.60	dσ/dΩ (μb/sr)=17 at 60°, 14 at 45°. L: $\sigma(\theta)$ gives L=4 which is not consistent with (pol t,α).
871 *4*	2	0.39	dσ/dΩ (μb/sr)=34 at 60°, 49 at 45°. E(level): this may be the 5/2^{+} state at 884.88.
906 *4*	0	0.28	dσ/dΩ (μb/sr)=43 at 60°, 58 at 45°.
1008 *4*	0	0.033	dσ/dΩ (μb/sr)≈5 at 60°, 5 at 45°.
1033 *4*	(5)	0.65	dσ/dΩ (μb/sr)=6 at 60°, 11 at 45°. L=(5) is inconsistent with J^{π}=(7/2^{+}) in the Adopted Levels, while a fit with L=(4) is marginally acceptable, consistent with J^{π}=(7/2^{+}).
1138 *4*	2	0.14	dσ/dΩ (μb/sr)=8 at 60°, 14 at 45°.
1181 *4*	(2)[#]	0.11	dσ/dΩ (μb/sr)=4 at 60°, 13 at 45°.
1192? *4*			dσ/dΩ (μb/sr)≈3 at 60°. E(level): from (α,t). Weakly populated in (^{3}He,d) with σ(60°)≈3.
1211 *4*			dσ/dΩ (μb/sr)≈4 at 60°, 8 at 45°.
1259 *4*	(2,3)[#]		dσ/dΩ (μb/sr)=9 at 60°, 15 at 45°.
1319 *4*			dσ/dΩ (μb/sr)=4 at 45°.
1367 *4*			dσ/dΩ (μb/sr)≈5 at 60°, 11 at 45°.
1405 *4*	5	0.67	dσ/dΩ (μb/sr)=8 at 60°, 12 at 45°.
1464 *4*	(4,5)[#]		dσ/dΩ (μb/sr)≈7 at 60°, 14 at 45°.
1531 *4*	3	0.12	dσ/dΩ (μb/sr)=6 at 60°, 12 at 45°.
1568 *4*			dσ/dΩ (μb/sr)≈3 at 60°, 6 at 45°.
1589 *4*	(4)	0.32	dσ/dΩ (μb/sr)=9 at 60°, 9 at 45°. L: $\sigma(\alpha$,t)/σ(^{3}He,d) favors L=5.
1641 *4*	2	0.38	dσ/dΩ (μb/sr)=37 at 60°, 63 at 45°.
1696 *4*	2	0.15	dσ/dΩ (μb/sr)=14 at 60°, 21 at 45°. L: $\sigma(\alpha$,t)/σ(^{3}He,d) favors L=3.

Continued on next page (footnotes at end of table)

^{148}Nd(^{3}He,d) 1976St10 (continued)

^{149}Pm Levels (continued)

E(level)	L†	S‡	Comments
1766 *4*	0	0.12	dσ/dΩ (μb/sr)=19 at 60°, 33 at 45°.
1782? *4*			dσ/dΩ (μb/sr)≈4 at 60°. E(level): from (α,t). Weakly populated in (^{3}He,d) with σ(60°)≈4.
1834 *4*			dσ/dΩ (μb/sr)=5 at 60°, 5 at 45°.

† From comparison of $\sigma(\theta)$ with DWBA calculations. For most cases values deduced from $\sigma(\alpha,t)/\sigma(^3He,d)$ ratios are also given by 1976St10 and are consistent with those from $\sigma(\theta)$. The active orbitals are $s_{1/2}$ for L=0, $d_{3/2}$ and $d_{5/2}$ for L=2, $g_{7/2}$ for L=4 and $h_{11/2}$ for L=5. For L=2, $d_{5/2}$ orbit is more likely at low energies and $d_{3/2}$ at higher energies.

‡ σ(exp)/(N×σ(theory)). σ(theory) is derived from a DWBA calculation using the computer code DWUCK, and optical model parameters and normalization factors given by the authors. Relative and absolute σ values are uncertain to 15% and 30%, respectively. The authors also give adopted values deduced from (^{3}He,d) and (α,t).

From $\sigma(\alpha,t)/\sigma(^3He,d)$ only.