^{150}Sm(^{3}He,α) 1980Re05,1975Lo04

History

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

1980Re05: E(^{3}He)=24 MeV from the Niels Bohr Institute tandem. Measured $\sigma(\theta)$ at 12 angles from 7.5° to 77.5° (c.m. system). FWHM≈30 keV. Absolute cross sections accurate to 15%. DWBA analysis of $\sigma(\theta)$ data.

1975Lo04: E(^{3}He)=24 MeV from the McMaster University tandem. Measured $\sigma(\theta)$ data at 2 angles. Absolute σ accurate to 25%. Ratios σ(d,t)/σ(^{3}He,α) used to assign L-transfers.

Others: 1977Se04. E=82 MeV. FWHM≈60-120 keV. Measurement of $\sigma(\theta)$ for a wide bump with centroid at 3.6 MeV. Authors deduce $h_{11/2}$ hole strength from the study of the continuum above 2 MeV.

2002Si09 (also 2001Si13): E=45 MeV. Measured level density and strength functions in (^{3}He,^{3}He′) and (^{3}He,α) reactions.

^{149}Sm Levels

Cross sections from 1980Re05 are for an angle where the value is maximum, whereas those form 1975Lo04 are at 40°.

Following levels from (d,t) are listed with dσ/dΩ<1 μb/sr in (^{3}He,α) by 1975Lo04: 399, 697, 967, 1011, 1083 and 1123. These are not included in this dataset.

E(level)[†]	J$^{\pi}$[b]	L[#]	S[@]	Comments
0[‡]	7/2^{-}	3	1.07	L,S: most likely for 0+22 levels. Other L=3, S=1.94 for 0+22 (1975Lo04). dσ/dΩ(μb/sr)=60 (1980Re05), 46 (40°) (1975Lo04).
22[‡]	5/2^{-}			
282 *5*	9/2^{-}	5	0.60	E(level): 280 *10* (1980Re05), 282 *5* (1975Lo04). L=5, S=1.02 (1975Lo04). dσ/dΩ(μb/sr)=45 (1980Re05), 38 (40°) (1975Lo04).
351?[&] *5*	3/2^{-}	1,0	0.23	L: 1,0 from cross section ratio, but (d,t) gives L=1 (1975Lo04). S: for L=1, J^{π}=3/2^{-} (1975Lo04). dσ/dΩ(μb/sr)<1 (40°) (1975Lo04).
422[a] *10*				dσ/dΩ(μb/sr)=9 (1980Re05).
530?[&] *5*	3/2^{-}	(1)	0.12	L=0 suggested from cross section ration in Fig. 5 of 1975Lo04, but L=1 in (d,t). S: for L=1, J^{π}=3/2^{-} (1975Lo04). dσ/dΩ(μb/sr)<1 (40°) (1975Lo04).
556 *5*	5/2^{-}	3	0.15	E(level): 546 *10* (1980Re05), 558 *5* (1975Lo04). L=2,3 from cross section ratio, but L=3 from (d,t); S=0.11 for L=3 (1975Lo04). dσ/dΩ(μb/sr)=7 (1980Re05), ≈3 (40°) (1975Lo04).
589 *5*				E(level): 585 *10* (1980Re05), 590 *5* (1975Lo04). dσ/dΩ(μb/sr)=5 (1980Re05).
636 *5*	7/2^{-}	3	0.31	E(level): 635 *10* (1980Re05), 636 *5* (1975Lo04). L=2 suggested from cross section ratio, but L=3 in (d,t); S=0.33 for L=3(1975Lo04). dσ/dΩ(μb/sr)=21 (1980Re05), 19 (40°) (1975Lo04).
664 *5*	11/2^{-}	5	0.16	E(level): 663 *10* (1980Re05), 664 *5* (1975Lo04). L=4,5 from cross section ratio, but L=5 from (d,t); S=0.38 for L=5(1975Lo04). dσ/dΩ(μb/sr)=13 (1980Re05), ≈6 (40°) (1975Lo04).
711?[&] *5*		(1,2)		L: from cross section ratio (1975Lo04). dσ/dΩ(μb/sr)<1 (40°) (1975Lo04).
878 *5*	13/2^{+}	6	0.77	E(level): 876 *10* (1980Re05), 879 *5* (1975Lo04). L=6 from cross section ratio, S=1.66 (1975Lo04). dσ/dΩ(μb/sr)=94 (1980Re05), 94 (40°) (1975Lo04).
925 *5*		(2)	0.31	E(level): 925 *10* (1980Re05), 925 *5* (1975Lo04). L=2 from cross section ratio (1975Lo04). S: from 1975Lo04 for L=2. dσ/dΩ(μb/sr)=9 (1980Re05), 4 (40°) (1975Lo04).
993 *5*				E(level): 991 *10* (1980Re05), 994 *5* (1975Lo04). dσ/dΩ(μb/sr)=5 (1980Re05), 3 (40°) (1975Lo04).

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^{150}Sm(^{3}He,α) 1980Re05,1975Lo04 (continued)

^{149}Sm Levels (continued)

E(level)[†]	J$^{\pi}$[b]	L[#]	S[@]	Comments
1049 *5*	(3/2)$^{+}$	2	0.89	E(level): 1047 *10* (1980Re05), 1050 *5* (1975Lo04). L=2,1 from cross section ratio, but (d,t) gives L=2 (1975Lo04). S: 1.20 (1975Lo04) for L=2. dσ/dΩ(μb/sr)=22 (1980Re05), 24 (40°) (1975Lo04).
1112[&] *5*				dσ/dΩ(μb/sr)=2 (40°) (1975Lo04).
1152 *5*		(2,3)		E(level): 1147 *10* (1980Re05), 1153 *5* (1975Lo04). L: from cross section ratio (1975Lo04). dσ/dΩ(μb/sr)=6 (1980Re05), 7 (40°) (1975Lo04).
1196 *5*	1/2^{+}	(0)	2.10	E(level): 1186 *10* (1980Re05), 1199 *5* (1975Lo04). L: 1980Re05 state that $\sigma(\theta)$ distribution has poor match with L=0 DWBA distribution. Other: L=1,2 from cross section ratio in 1975Lo04, but L=0 from (d,t). S: 4.9 (1975Lo04) for L=0. dσ/dΩ(μb/sr)=25 (1980Re05), 22 (40°) (1975Lo04).
1242 *5*		(5)	0.15	E(level): 1236 *10* (1980Re05), 1244 *5* (1975Lo04). dσ/dΩ(μb/sr)=19 (1980Re05), 14 (40°) (1975Lo04).
1310 *5*	11/2^{-}	5	1.2	E(level): 1307 *10* (1980Re05), 1311 *5* (1975Lo04). J$^{\pi}$: cross section ratio suggests high-spin level (1975Lo04). S: 2.2 (1975Lo04) for L=5. dσ/dΩ(μb/sr)=106 (1980Re05), 81 (40°) (1975Lo04).
1375[&] *5*		(3,4)		L: from cross section ratio (1975Lo04). dσ/dΩ(μb/sr)$\leq$5 (40°) (1975Lo04).
1419[&] *5*		(1,2)		L: from cross section ratio (1975Lo04). dσ/dΩ(μb/sr)$\approx$2 (40°) (1975Lo04).
1442[&] *5*				L=1 from cross section ratio (1975Lo04).
1474 *5*		(5)		E(level): 1464 *10* (1980Re05), 1477 *5* (1975Lo04). L: from $\sigma(\theta)$ in Fig. 5 of 1980Re05. Other: 0,1,2 (1975Lo04) from cross section ratio. dσ/dΩ(μb/sr)=10 (1980Re05), $\approx$6 (40°) (1975Lo04).
1572 *5*		(4,5)		E(level): 1575 *10* (1980Re05), 1571 *5* (1975Lo04). L: from cross section ratio (1975Lo04). dσ/dΩ(μb/sr)=9 (1980Re05), 8 (40°) (1975Lo04).
1683 *10*				dσ/dΩ(μb/sr)=9 (1980Re05).
1782 *10*				dσ/dΩ(μb/sr)=7 (1980Re05).
2043 *10*				dσ/dΩ(μb/sr)=12 (1980Re05).
2187 *10*		(5)		dσ/dΩ(μb/sr)=30 (1980Re05).
2298 *10*				dσ/dΩ(μb/sr)=14 (1980Re05).
2412 *10*		(2)		dσ/dΩ(μb/sr)=30 (1980Re05).
2442 *10*		(5)		dσ/dΩ(μb/sr)=45 (1980Re05).
2481 *10*		(5)		dσ/dΩ(μb/sr)=31 (1980Re05).
2594 *10*		2		dσ/dΩ(μb/sr)=23 (1980Re05).
3600				E(level): from 1977Se04. Centroid of a wide structure. L: $\sigma(\theta)$ data for this bump corresponds to high L-value (1977Se04). A large part of the cross section is due to $h_{11/2}$ single-particle strength.

[†] Weighted averages taken when a level is reported in 1980Re05 and 1975Lo04. Above 1580, levels are reported by 1980Re05 only.

[‡] 0+22 form a composite structure, as stated by 1975Lo04. 1980Re05 do not mention contribution form the 22-keV level, but it must be present as L=3 for both the g.s. and the 22 level.

[#] From comparison of $\sigma(\theta)$ data with DWBA calculations in 1980Re05, unless otherwise stated.

[@] Nuclear structure factors defined as σ(exp)/(2N$\times\sigma$(DWBA)), where N=12.9. Values are from 1980Re05 unless otherwise stated. In 1975Lo04, S-factors are σ(exp)/(N$\times\sigma$(DWBA)), where N=22.6.

[&] Level from 1975Lo04 only; L-transfer from [dσ/dΩ(^{3}He,α)(60°)]/[dσ/dΩ(d,t)(90°)] ratios.

[a] Level from 1980Re05 only.

[b] From the Adopted Levels.