^{150}Sm(p,d) 1983Ga07

History

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

Includes ^{150}Sm(p,dγ) from 2019Na10.

1983Ga07: E=42 MeV from the K50 Michigan State University cyclotron. Measured $\sigma(\theta)$ from 7° to 55° (lab system) in steps of 5°. FWHM=25-35 keV. Uncertainty in absolute σ is 10%. DWBA analysis. L-transfers and nuclear structure factors deduced.

1969Ya08: E=55 MeV from the INS Tokyo synchrocyclotron. FWHM≈80 keV. $\sigma(\theta)$ from 5° to 50° (lab) in steps of 5°. Uncertainty in absolute σ is 15%.

1974GrYX (thesis): E=20 MeV. $\sigma(\theta)$ data from 5° to 170°. FWHM≈35 keV. DWBA analysis. L-transfers deduced.

2019Na10: ^{150}Sm(p,dγ),E=28 MeV; measured deuteron spectra, Eγ, Iγ, and dγ-coin using the Hyperion array with ΔE-E telescope and HPGe clover detector array at the Cyclotron Institute of Texas A&M University. Deduced nuclear level densities (NLDs) and γ-strength function (γSF) using the Oslo method, total B(M1) strength, parameters for giant resonances.

All data are from 1983Ga07 unless otherwise stated.

^{149}Sm Levels

E(level)[†]	J$^\pi$[&]	L[#]	C^{2}S[@]	Comments
0	7/2$^-$	3	1.3	L=3, S=3.5 (1969Ya08).
281[‡] *5*	9/2$^-$&5/2$^-$	5+3	0.43,0.25	L: 50%(L=5)+50%(L=3). E(level): corresponds to 277 and 286 levels. E=280 *20*, L=3, S=1.4 (1969Ya08).
348 *5*	3/2$^-$	1	0.20	
392[a] *10*		(1)		
531[‡] *5*	3/2$^-$&5/2$^-$	1+3	0.09,0.13	L: 50%(L=1)+50%(L=3). E(level): corresponds to 528 and 558 levels. 1974GrYX give energy=560 and L=(3). E=540 *20*, L=3, S=1.1 (1969Ya08).
583[a] *10*		(1)		L: inconsistent with J^π=9/2$^-$ for 591 level in the Adopted Levels.
636 *5*	7/2$^-$	3	0.35	E=640 *20*, L=3, S=0.48 (1969Ya08).
665[a] *10*		(2)		E(level),L: not clear whether this level corresponds to a tentative 659 level or the 664, 11/2$^-$ level. L=2 is, however, inconsistent with the latter assignment.
694 *5*	(3/2)$^-$	1	0.13	
777[a] *10*		(0)		E(level),L: from other studies, known levels are 785, 5/2$^-$ and 790, 11/2$^+$. L=0 is not consistent with either of these.
874[‡] *5*	13/2$^+$&(1/2$^-$)	6+(1)	0.72,0.07	L: 60%(L=6)+40%(L=1). L=(5) from 1969Ya08 for an 890 *20* level is inconsistent with J^π=13/2$^+$. C^{2}S: for J^π=13/2$^+$ and 1/2$^-$. E(level): 1969Ya08 give 890 *20* with L=5, and S=4.1, whereas 1983Ga07 give 847 *5* with L=6(+1). Energy quoted by 1983Ga07 seems erroneous. From spectrum in 1983Ga07, evaluators estimate the peak at 874 and not at 847. The two components with L=6 and L=(1) most likely correspond to 878.6 and 881.9 levels (see Adopted Levels). The L=5 assignment by 1969Ya08 is inconsistent with L=6 from (d,t) and multipolarity assignment from ce data in in-beam γ-ray study.
926[a] *10*		(2)		
968[a] *10*		(0)		
1009[a] *10*		(1)		
1038 *10*	(3/2)$^+$	2	0.87	E=1040 *20*, L=2, S=2.3 (1969Ya08).
1181[‡] *10*	1/2$^+$&(3/2$^+$)	0+2	0.85,0.74	E=1190 *20*, L=0+2, S=2.1, 1.1 (1969Ya08).
1226[a] *10*				
1285 *10*	(11/2)$^-$	5	1.60	E(level),L: identified with $\nu h_{11/2}$ level at 1308.8 from in-beam γ-ray. 1969Ya08 give E(level)=1310 and L=5, S=6.5, which agrees with 11/2$^-$ assignment. L=0 assignment for a level at 1311 (1974GrYX) seems incorrect.
1352 *10*	5/2$^-$	(3)	0.07	L: 1974GrYX give L=0 for a level at 1344.

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^{150}Sm(p,d) 1983Ga07 (continued)

^{149}Sm Levels (continued)

E(level)[†]	Jπ[&]	L[#]	C^2S[@]	Comments
1376[a] *10*		(0)		
1408 *10*	$(5/2)^-$	3	0.12	
1456 *10*	$(3/2,5/2)^+$	2	0.12	L: 1974GrYX give L=0 for a level at 1439. E=1480 *20*, L=2, S=0.70 (1969Ya08).
1480[a] *10*		(1)		
1538[a] *10*		(0)		
1579 *10*	$(3/2,5/2)^+$	2	0.05	
1616 *10*	$(5/2)^-$	3	0.07	E=1640 *20*, L=(2), S=0.35 (1969Ya08).
1673 *10*				
1767[‡] *10*	$(7/2^+)$&$(5/2^+)$	4+2	0.09,0.04	L: 40%(L=4)+60%(L=2). E=1780 *20*, L=2, S=0.33 (1969Ya08).
1880 *10*	$(7/2)^+$	4	0.11	
1946[‡] *10*	$(7/2^+)$&$(5/2^+)$	4+2	0.09,0.04	L: 80%(L=4)+20%(L=2).
2021[‡] *15*	$(5/2^+)$&$(11/2^-)$	2+5	0.16,0.14	L: 70%(L=2)+30%(L=5). L=0 for a 2047 level (1974GrYX) seems suspect. E=2040 *20*, L=2, S=0.79 (1969Ya08).
2174[‡] *15*	$(5/2^+)$&$(11/2^-)$	2+5	0.13,0.25	L: 70%(L=2)+30%(L=5).
2211[‡] *15*	$(5/2^+)$&$(11/2^-)$	2+5	0.16,0.31	L: 70%(L=2)+30%(L=5). E=2200 *20*, L=(2), S=1.1 (1969Ya08).
2283[‡] *15*	$(5/2^+)$&$(7/2^+)$	2+4	0.11,0.22	L: 60%(L=2)+40%(L=4).
2422[‡] *15*	$(5/2^+)$&$(11/2^-)$	2+5	0.10,0.21	L: 50%(L=2)+50%(L=5).
2459[‡] *15*	$(5/2^+)$&$(11/2^-)$	2+5	0.17,0.34	L: 50%(L=2)+50%(L=5). E=2480 *20*, L=2, S=1.2 (1969Ya08).
2580 *15*	$(5/2)^+$	2	0.26	E=2590 *20*, L=2, S=1.1 (1969Ya08).
2701[‡] *15*	$(5/2^+)$&$(11/2^-)$	2+5	0.08,0.07	
3360[b]				E(level): centroid of a wide bump between 2800 and 4000. $\sigma(\theta)$ shows L=2+5. C^2S=1.6. A similar structure observed at 3600 in (^{3}He,α).
5600[b]				E(level): centroid of a bump between 4000 and 7200. $\sigma(\theta)$ shows L=2+4. C^2S=0.9.

[†] From 1983Ga07, unless otherwise stated.
[‡] Unresolved doublet inferred from mixed L-transfers (1983Ga07).
[#] From 1983Ga07, unless otherwise stated. In several cases $\sigma(\theta)$ data (1983Ga07) were fitted with mixed L-transfers, whereas 1969Ya08 and 1974GrYX generally fitted to a single L-transfer. For mixed L-transfers, contribution from each L-value used in fitting $\sigma(\theta)$ data is given under comments.
[@] C^2S values defined as σ(exp)/(N×σ(DWUCK)/(2J+1)), where N=23 (1983Ga07). 1974GrYX do not give S-factors. 1969Ya08 give S-factors but the definition of S in their work is unclear.
[&] As proposed by 1983Ga07 with the assumption of the following shell-model orbitals for the transferred nucleon: $p_{3/2}$ for L(n)=1; $d_{3/2}$ (below≈1.5 MeV excitation) and $d_{5/2}$ (above≈1.5 MeV excitation) for L(n)=2; $f_{5/2}$ for L(n)=3; $g_{7/2}$ for L(n)=4; $h_{11/2}$ for L(n)=5. These assignments are consistent with those in Adopted Levels.
[a] Level from 1974GrYX only. Estimated uncertainty=10 keV. L(p,d) assignments treated questionable.
[b] Wide bumps in continuum region above 2800.