^{152}Sm(d,p) 1965Ke09,1972Ka07

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 170, 1 (2020)	16-Aug-2020

1965Ke09: E=12 MeV; observed protons at five angles from 25° to 125°with FWHM ≈ 0.1%. Deduced 132 excited levels to E=3929 keV.
1972Ka07: E=12 MeV; observed protons at 90° and 125° with FWHM = 13 keV. Deduced 56 excited levels to E=1991 keV.
1997GoZn: E=25 MeV. The proton spectrum at 35° shown up to about 925 keV with about 37 groups. Cross section ratios: dσ(p,d)/dσ(d,p) listed for 36 levels up to 885 keV.

^{153}Sm Levels

Relative intensities from 1965Ke09 at 35°

Level energy	Intensity	Level energy	Intensity
0	1.00	2188	
35	2.50	2202	11.50
65	1.40	2240	7.90
91	0.53	2286	5.25
125	1.80	2302	4.00
176	----	2332	3.00
	5.80*	2355	2.50
182	----	2366	4.35
262	6.80	2394	3.70
322	1.75	2413	4.00
370		2456	6.40
411	5.90	2484	5.35
420	6.40	2506	4.20
450	1.15	2534	3.95
501	0.42	2561	5.40
527	3.40	2575	7.40
548	7.00	2601	4.20
698	13.5	2619	3.95
736	0.69	2634	4.30
754	3.90	2669	3.55
799	4.70	2686	12.00
923	5.00	2721	3.95
966	0.38	2751	3.40
987	2.00	2788	3.40
1066	0.26	2832	10.90
1081	1.75	2880	3.15
1114	0.48	2912	3.50
1139	0.20	2944	3.25
1168	3.40	2972	7.10
1204	1.60	2994	5.40
1229		3021	
1256		3047	
1295	0.39	3073	10.30
1310		3097	8.50
1327		3113	7.30
1349	0.30	3135	13.60
1367	1.30	3158	6.60
1396	1.40	3187	5.75
1431	0.88	3214	6.80
1472		3236	4.85
1491		3253	4.95
1506		3268	3.30
1540	3.90	3291	6.20
1564	5.35	3316	3.90
1603	----	3349	9.10
1612	8.20	3361	4.20
1624	----	3380	5.90

1643	4.50	3396	3.95
1679	9.10	3414	3.40
1719	2.35	3469	5.95
1741	7.17	3501	4.50
1751		3513	5.40
1774	1.80	3558	----
1792	1.70		5.30
1812	1.10	3563	----
1830	2.70	3579	5.65
1838	3.00	3601	3.65
1887	1.90	3635	4.85
1903	11.20	3676	8.25
1935	1.66	3716	4.90
1968	5.90	3736	5.80
1991	4.50	3759	6.90
2029	3.60	3809	4.60
2076	3.00	3834	7.20
2121		3856	9.80
2128		3890	3.70
2144		3913	4.90
2165		3929	5.00

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*For 176+182

E(level)†	Jπ‡	L#	dσ/dΩ (μb/sr)f	Comments
0g	3/2+	≤2	21	dσ(p,d)/dσ(d,p)=23 (1997GoZN). Jπ: 1972Ka07 estimated that the g.s. consists of 3/2[651] (≈ 84%) and 3/2[402] (≈ 15%), with small contributions from the 3/2+ rotational states of the 1/2[400] and 1/2[660] bands.
7.5b				dσ(p,d)/dσ(d,p)=8.7 (1997GoZN).
35h 2	3/2−	≤2	44	dσ(p,d)/dσ(d,p)=2.9 (1997GoZN).
53b				dσ(p,d)/dσ(d,p)=8.0 (1997GoZN).
64g 2	9/2+	≥3	51	dσ(p,d)/dσ(d,p)=8.5 (1997GoZN).
91b				dσ(p,d)/dσ(d,p)=13.5 (1997GoZN).
98i	(11/2−)	≤2	17	dσ(p,d)/dσ(d,p)=21.1 (1997GoZN). Jπ: Adopted J^π is 11/2− with 11/2[505] configuration (1972Ka07), which conflicts with the L value (1965Ke09). E(level): from 1997GoZN.
125j 2	3/2−	≤2	33	dσ(p,d)/dσ(d,p)=13.7 (1997GoZN).
176h 3	7/2−	@	111	dσ(p,d)/dσ(d,p)=1.2 (1997GoZN).
182j 5	5/2−	@		dσ(p,d)/dσ(d,p)=11.0 (1997GoZN).
194&ag 3	13/2+		50	dσ(p,d)/dσ(d,p)=1.3 (1997GoZN).
237& 5			≈3	
262j 3	7/2−	≥3	173	dσ(p,d)/dσ(d,p)=1.9 (1997GoZN).
320k 5	3/2+	≤2	44	dσ(p,d)/dσ(d,p)=42.7 (1997GoZN).
357b				dσ(p,d)/dσ(d,p)=10.0 (1997GoZN).
361&ak	5/2+		9	dσ(p,d)/dσ(d,p)=13.3 (1997GoZN).
370ac 6				dσ(p,d)/dσ(d,p)=15.0 (1997GoZN).
409 4			110	dσ(p,d)/dσ(d,p)=31.2 (1997GoZN).
420acm 7	1/2+			dσ(p,d)/dσ(d,p)=78.2 (1997GoZN).
447b				dσ(p,d)/dσ(d,p)=3.6 (1997GoZN).
449 4	(5/2−)	≤2	19	E(level): 2005Bu21 assigned a dominant configuration of 5/2[523] from results of their (t,p) study. The same assignment is given in 'Adopted Levels'. The earlier assignment (1998He06) as member of the 1/2[530] band is rejected. dσ(p,d)/dσ(d,p)=1.0 (1997GoZN).
481b				dσ(p,d)/dσ(d,p)=65 (1997GoZN).

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^{152}Sm(d,p) 1965Ke09,1972Ka07 (continued)

^{153}Sm Levels (continued)

E(level)[†]	Jπ[‡]	L[#]	dσ/dΩ (μb/sr)[f]	Comments
496 *7*		≥3	17	dσ(p,d)/dσ(d,p)=2.9 (1997GoZN).
508[b]				dσ(p,d)/dσ(d,p)=24 (1997GoZN).
525[l] *4*	(7/2⁻)	≥3	42	dσ(p,d)/dσ(d,p)=8.6 (1997GoZN).
547 *4*		≥3	142	dσ(p,d)/dσ(d,p)=1.1 (1997GoZN).
630[b]				dσ(p,d)/dσ(d,p)=1.1 (1997GoZN).
665[&a]			9	dσ(p,d)/dσ(d,p)=0.1 (1997GoZN).
696[n] *5*	(1/2⁻)	≤2	183	dσ(p,d)/dσ(d,p)=0.5 (1997GoZN).
728[b]				dσ(p,d)/dσ(d,p)=7.3 (1997GoZN).
732[o] *8*	(1/2⁺)		7	dσ(p,d)/dσ(d,p)=86 (1997GoZN).
751[n] *6*	(3/2⁻)	≤2	52	dσ(p,d)/dσ(d,p)=1.1 (1997GoZN).
766[b]				dσ(p,d)/dσ(d,p)=28 (1997GoZN).
778[b]				dσ(p,d)/dσ(d,p)=19 (1997GoZN).
788[b]				dσ(p,d)/dσ(d,p)=70 (1997GoZN).
798[n] *5*	(5/2⁻)	≥3	81	dσ(p,d)/dσ(d,p)=0.4 (1997GoZN).
841[&]			≈2	
881[&a]			≈1	dσ(p,d)/dσ(d,p)=36 (1997GoZN).
921[n] *6*	(7/2⁻)	≥3	124	
963 *9*			5	
984 *6*			28	
1000[&]			14	
1066[c] *6*				
1078 *6*			29	
1110 *7*			21	
1139[c] *7*				
1168 *7*			56	
1201 *7*			30	
1229[c] *12*				
1260 *12*			10	
1295 *14*			15	
1310[e] *10*				
1327[e] *12*			23	
1346 *12*			7	
1365[d] *12*			21	
1393 *8*			39	
1431 *10*			14	
1468 *10*			77	
1491[c] *12*				
1506[c] *8*				
1540 *8*			52	
1563 *8*			49	
1603 *9*			≈39	
1612[e] *12*			≈39	
1624[e] *12*				
1643 *9*			24	
1679 *9*			168	
1715 *9*			40	
1742 *9*			78	
1751[c] *12*				
1776 *12*			≈24	
1793 *12*			≈28	
1815 *12*			≈26	
1830[c] *9*				

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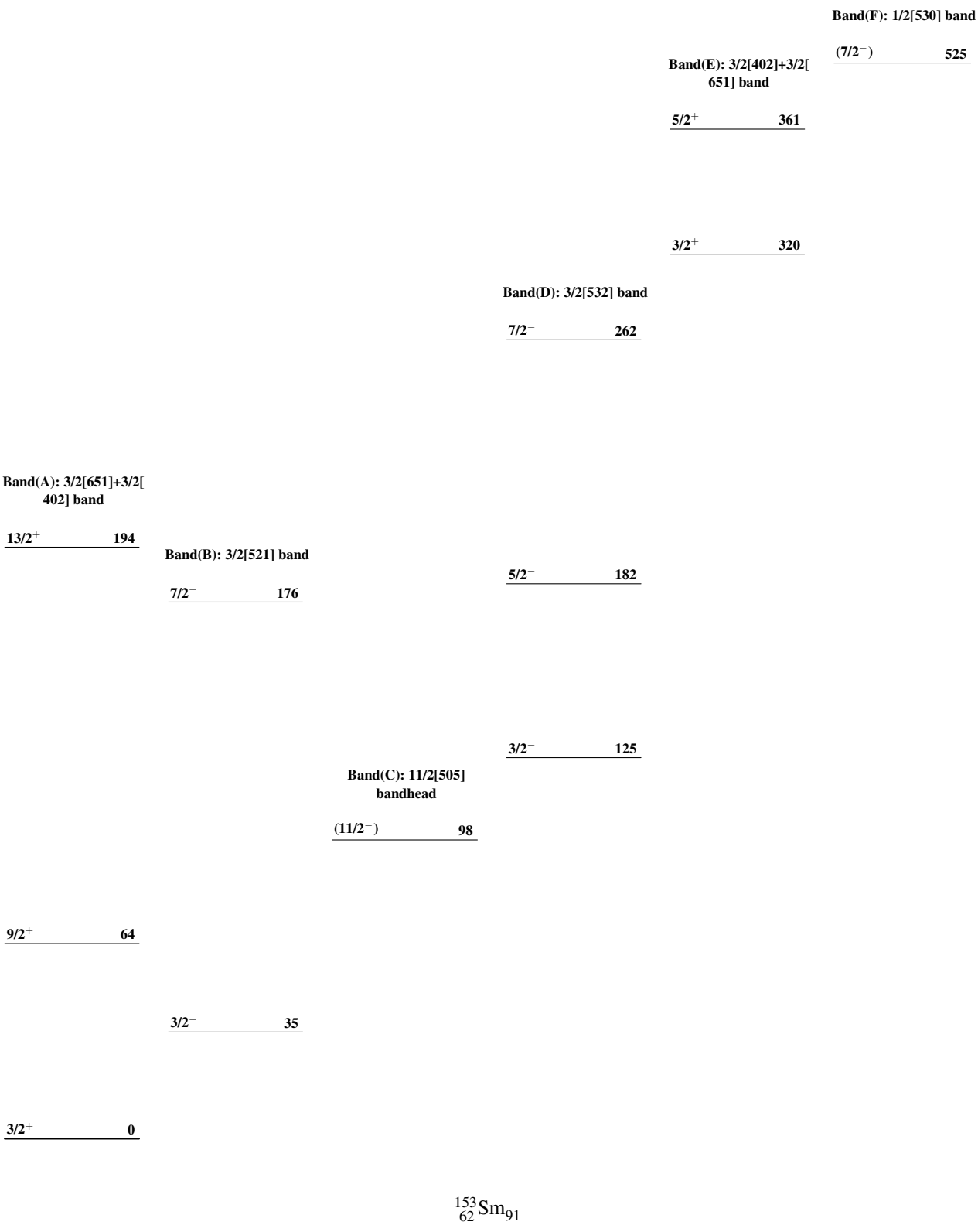
^{152}Sm(d,p) 1965Ke09,1972Ka07 (continued)

^{153}Sm Levels (continued)

E(level)[†]	dσ/dΩ (μb/sr)[f]	E(level)[†]	E(level)[†]
1842 *12*	≈44	2561 *11*	3268 *16*
1864[&]	≈32	2575 *15*	3291 *12*
1885 *11*	≈31	2601 *15*	3316 *16*
1904 *9*	226	2619 *15*	3349 *12*
1931 *14*	≈30	2634 *15*	3361 *12*
1969 *12*	68	2669 *15*	3380 *15*
1991 *10*	56	2686 *11*	3396 *15*
2029 *10*		2721 *12*	3414 *15*
2076 *10*		2751 *12*	3469 *17*
2121 *15*		2788 *14*	3501 *17*
2128 *15*		2832 *11*	3513 *17*
2144 *15*		2880 *12*	3558 *17*
2165 *15*		2912 *14*	3563 *19*
2188 *15*		2944 *14*	3579 *17*
2202 *12*		2972 *15*	3601 *19*
2240 *16*		2994 *15*	3635 *19*
2286 *11*		3021 *15*	3676 *13*
2302 *14*		3047 *15*	3716 *17*
2332 *15*		3073 *15*	3736 *17*
2355 *15*		3097 *12*	3759 *13*
2366 *15*		3113 *16*	3809 *16*
2394 *15*		3135 *12*	3834 *13*
2413 *15*		3158 *14*	3856 *13*
2456 *11*		3187 *16*	3890 *17*
2484 *11*		3214 *16*	3913 *17*
2506 *14*		3236 *16*	3929 *17*
2534 *11*		3253 *16*	

[†] Unweighted average of values from 1965Ke09 and 1972Ka07 with uncertainty from 1965Ke09. Only 1965Ke09 give values above 2 MeV and below this energy, it is noted if a level is reported only in one reference.
[‡] Deduced from L-values and energy fits to rotational bands as given by 1972Ka07; others of 1965Ke09 are often different.
[#] Values are from 1965Ke09 and are based on observed angular distributions compared with DWBA predictions.
[@] L ≥ 3 for 176+182.
[&] From 1972Ka07 only.
[a] Level also reported by 1997GoZN.
[b] Level from 1997GoZN only, rounded off energy from 'Adopted Levels'.
[c] From 1965Ke09 only.
[d] Tabulated value of 1965Ke09 is 1349, but this is apparently a misprint since associated Q value implies 1367 keV.
[e] Levels of 1972Ka07 at 1319 and 1618 are assumed to be doublets, so level energies are from 1965Ke09.
[f] From 1972Ka07, at 90°. Values are also listed at 125° by 1972Ka07. Relative intensities are listed by 1965Ke09 at 35°.
[g] Band(A): 3/2[651]+3/2[402] band.
[h] Band(B): 3/2[521] band.
[i] Band(C): 11/2[505] bandhead.
[j] Band(D): 3/2[532] band.
[k] Band(E): 3/2[402]+3/2[651] band.
[l] Band(F): 1/2[530] band.
[m] Band(G): 1/2[400]+1/2[660] band.
[n] Band(H): 1/2[521] band.
[o] Band(I): 1/2[660]+1/2[400] band.

^{152}Sm(d,p) 1965Ke09,1972Ka07



$^{153}_{62}Sm_{91}$

^{152}Sm(d,p) 1965Ke09,1972Ka07 (continued)

Band(H): 1/2[521] band

(7/2$^-$) 921

(5/2$^-$) 798

(3/2$^-$) 751

Band(I): 1/2[660]+1/2[400] band

(1/2$^+$) 732

(1/2$^-$) 696

Band(G): 1/2[400]+1/2[660] band

1/2$^+$ 420

$^{153}_{62}Sm_{91}$