^{152}Sm(α,t) 2005Bu02

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

Additional information 1.

E=25 MeV. Measured E(tritons), $\sigma(\theta)$ with a magnetic spectrograph and photographic plates as detectors. The particle spectra were obtained at reaction angles of θ=6°,15°,40°,60° and 90°. DWBA analysis. FWHM ≈ 10 keV.

Others:

1981Ow02: E=35 MeV. Measured E(tritons), magnetic spectrograph, FWHM=20 keV. The spectrum figure shows 27 groups up to ≈ 1550 keV. In authors' table 1, cross sections are listed for levels up to 396 keV. This work mainly deals with the form factors in single-particle transfer reactions.

1970Bu21: Discussion of levels at 83, 173 and 322 keV.

^{153}Eu Levels

The assignments for 5/2[413], 5/2[532], 3/2[411], 1/2[420] and 7/2[404] bands are from the literature. The 7/2[523], 3/2[541] and 1/2[541] assignments are from 2005Bu02.

Differential cross section data in μb/sr at 60°

Level	dσ/dΩ	Level	dσ/dΩ
0	1.2 *3*	762	2 *1*
83	40 *2*	784	2 *1*
96	3 *1*	821	5 *1*
105	2.5 *4*	840	6 *1*
150	4 *1*	889	4 *1*
173	88 *3*	1072	13 *1*
191	2.5 *4*	1137	8 *1*
235	5 *1*	1167	≤1
269	1.5 *4*	1180	3 *1*
322	92 *3*	1188	≤2
395	4 *1*	1220	4 *1*
569	42 *2*	1231	6 *1*
616	≤2	1244	4 *1*
694	37 *2*	1306	2.4 *4*
706	18 *3*	1332	4 *1*
716	22 *2*	1359	9 *1*
722	≈4	1477	3 *1*

E(level)[†]	Jπ[@]	L[&]	NSF[a]	Comments
0[b] *2*	5/2+		≈0.01	
83[b] *1*	7/2+	(4)	0.48	L: σ ratio suggests L=4,5; but band assignment requires L=4.
96[c] *2*	5/2−		0.01	
105[d] *2*	3/2+	(2)	0.016	
150[c] *2*	7/2−		0.02	
173[d]	5/2+	(2)	0.59	
191[b] *2*	9/2+		0.03	
235[c] *2*	9/2−		0.04	
269[d] *3*	7/2+		0.02	
322[c] *1*	11/2−	(5)	0.83	
395[d] *2*	9/2+		0.06	
569[f] *1*	7/2+	(4)	0.66	L: σ ratio suggests L=4,5; but band assignment requires L=4.

Continued on next page (footnotes at end of table)

^{152}Sm(α,t) 2005Bu02 (continued)

^{153}Eu Levels (continued)

E(level)†	Jπ@	L&	NSF[a]	Comments
616 *2*	(5/2+)			Jπ: from 'Adopted Levels' for ^{153}Eu.
694‡[e] *1*	5/2+	(2)	0.37	
706 *2*	5/2+		≈0.18	This level is strongly mixed, having 5/2[402] and 1/2[420] configurations and probably other components as discussed in 2005Bu02.
716‡[e] *2*	3/2+	(2)	0.22	
≈722				
762 *3*				
784 *3*		(2)		
821‡[h] *2*	11/2−	(5)	0.06	
840 *2*		(1,2)		
889[e] *3*	7/2+	(4)	0.09	L: σ ratio suggests L=3 or 4; L=4 required by band assignment.
1072‡[g] *2*	11/2−	(5)	0.20	
1137 *2*		(4,5)		
1167?#			#	
1180 *3*				
1188?#			#	
1220[i] *2*	(5/2−)		0.047	L: σ ratio suggests L=2.
1231 *2*		(3)		
1244 *2*				
1306 *3*		(2,1)		
1332[i] *2*	(9/2−)		0.08	L: σ ratio suggests L=3,4.
1359 *2*	(5/2−)		0.12	L: σ ratio suggests L=2.
1477 *2*	5/2+	(2)	0.10	

† Averages from spectra at several angles, and are measured relative to the strongly populated 5/2+, 173 level.
‡ 2005Bu02 indicates that this level is strongly mixed. For detailed discussion see 2005Bu02.
# Energy from (^{3}He,d) reaction, not seen in (α,t). Only an upper limit of cross section in (α,t) is given.
@ From Adopted Levels for most of the levels.
& Deduced from comparison of the measured ratios [dσ/dΩ in (^{3}He,d)$_{\theta=30°}$]/[dσ/dΩ in (α,t)$_{\theta=60°}$] with those calculated from DWBA. These ratios do not give definitive L values but serve as guides to possible L values.
[a] The spectroscopic strengths are given as Nuclear Structure Factors, NSF=[dσ/dΩ(exp)]/[2N(dσ/dΩ(DWBA))], N=135. These values are compared with the calculated values for 'unmixed' and 'mixed' configurations given in table 3 of 2005Bu02.
[b] Band(A): 5/2[413].
[c] Band(B): 5/2[532].
[d] Band(C): 3/2[411].
[e] Band(D): 1/2[420].
[f] Band(E): 7/2[404].
[g] Band(F): 7/2[523].
[h] Band(G): 3/2[541].
[i] Band(H): 1/2[541] band (?). Possible band assignment from 2005Bu02 based on systematics of neighboring nuclides and approximate L values from (α,t)/(^{3}He,d) σ ratio.

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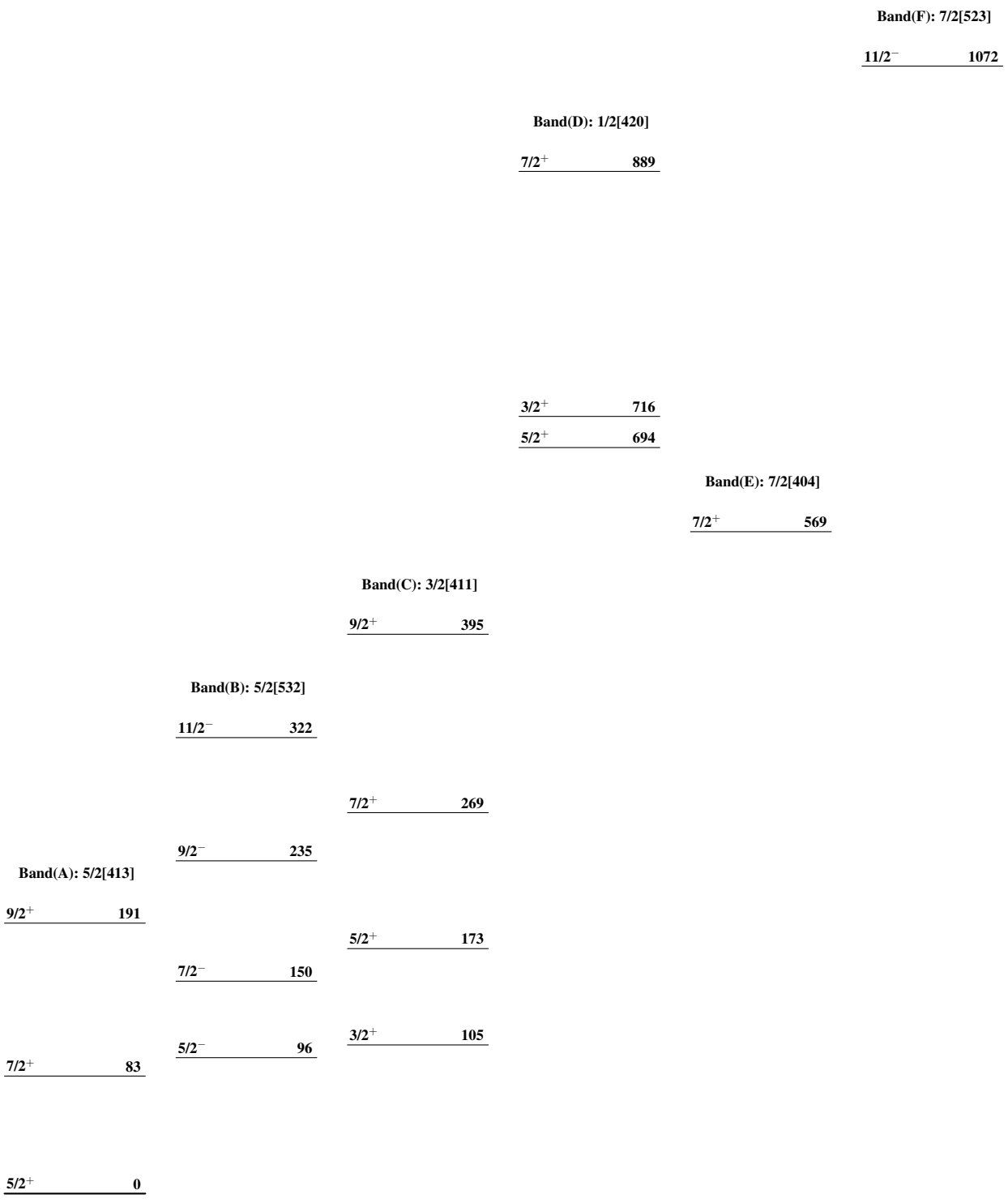

$^{153}_{63}Eu_{90}$

^{152}Sm(α,t) 2005Bu02 (continued)

Band(H): 1/2[541] band (?)

(9/2$^-$) 1332

(5/2$^-$) 1220

Band(G): 3/2[541]

11/2$^-$ 821

$^{153}_{63}Eu_{90}$