^{154}Gd(t,α) 2005Bu02

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

Additional information 1.

E=15 MeV. Measured Eα, $\sigma(\theta)$ with the Q3D magnetic spectrometer and a helical-cathode delay-line detector. The α-particle spectra were obtained at reaction angles of θ = 15°, 20°, 30° and 45°. Normalization factors to convert intensities of peaks in the spectra to absolute cross sections were obtained with cooled Si surface-barrier monitor counters in the target chambers, which recorded elastically scattered beam particles atθ=45°. DWBA analysis. FWHM ≈ 13 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

Level	dσ/dΩ (45°)	dσ/dΩ (30°)
0	5 *1*	5 *1*
84	82 *3*	112 *3*
105	14 *2*	8 *1*
151	19 *1*	26 *1*
173	131 *4*	148 *3*
194	9 *2*	9 *2*
234	8 *1*	10 *1*
269	4 *1*	4 *1*
322	152 *4*	230 *4*
396	8 *1*	9 *1*
480	1.4 *4*	5 *1*
538	1.4 *4*	
569	20 *1*	31 *1*
590	3 *1*	22 *1*
636	28 *2*	32 *1*
695	121 *7*	169 *5*
707	13 *6*	20 *8*
719	42 *8*	62 *2*
736	6 *2*	
764	2 *1*	
785	2 *1*	3 *1*
819	34 *2*	48 *2*
855	3 *1*	
892	16 *1*	20 *1*
924	5 *1*	8 *1*
965	14 *1*	13 *1*
986	3 *1*	3 *1*
1026	4 *1*	2 *1*
1071	9 *1*	12 *1*
1123	2 *1*	2 *1*
1152	9 *1*	8 *1*
1180	8 *2*	11 *1*
1225	12 *1*	14 *1*
1244	7 *1*	15 *1*
1271	6 *1*	8 *1*
1310	23 *2*	27 *1*
1332	6 *1*	10 *1*
1356	8 *1*	14 *1*
1435	9 *1*	12 *1*
1546	8 *1*	
1630	6 *1*	
1660	4 *1*	
1720	5 *1*	

1740 3 *1*
1779 5 *1*

E(level)[†]	Jπ[#]	NSF[@]	Comments
0[&]	5/2+	0.014	E(level): measured value is 1 *2* (2005Bu02).
84[&] *1*	7/2+	0.71	
105[b] *3*	5/2−&3/2+	≤0.02	NSF: for 5/2−; ≤0.025 for 3/2+. E(level): doublet corresponding to 97.43 and 103.18 in 'Adopted Levels' for ^{153}Eu.
151[a] *1*	7/2−	≈0.05	
173[b]	5/2+	0.42	
194[&] *2*	9/2+	0.04	
234[a] *1*	9/2−	0.07	
269[b] *2*	7/2+	≈0.03	
322[a] *1*	11/2−	1.2	
396[b] *2*	9/2+	0.05	
480[a] *3*	13/2−&13/2+		E(level): doublet corresponding to 477.93 and 481.05 in 'Adopted Levels' for ^{153}Eu.
538[b] *3*	11/2+		
569[d] *2*	7/2+	0.19	
590[a] *2*	15/2−		
636[f] *2*	1/2+&3/2−	≤0.10	E(level): doublet corresponding to 634.59 and 636.52 in 'Adopted Levels' for ^{153}Eu. NSF: for 1/2+; ≤0.05 for 3/2−.
695[‡c] *2*	5/2+	0.43	
707 *5*	5/2+	≈0.05	This level is strongly mixed, having 5/2[402] and 1/2[420] configurations and other components as discussed in 2005Bu02.
719[‡c] *2*	3/2+	≈0.16	
736 *3*			
764 *2*			
785 *2*			
819[‡f] *2*	11/2−	0.27	
855 *3*			
892[c] *2*	7/2+	0.14	
924 *2*			
965 *2*			
986 *3*			
1026 *3*			
1071[‡e] *3*	11/2−	≈0.08	
1123 *3*			
1152[‡] *3*	5/2+		
1180 *3*			
1225[g] *3*	(5/2−)	0.03	
1244 *3*			
1271 *3*			
1310 *3*			
1332[g] *3*	(9/2−)	0.08	
1356 *3*	(5/2−)	0.03	
1435 *3*			
1477?	5/2+	≤0.005	E(level): level not observed in (t,α), energy from (α,t) and (^{3}He,d).
1546 *3*			
1630 *3*			
1660 *3*			
1720 *4*			
1740 *4*			
1779 *4*			

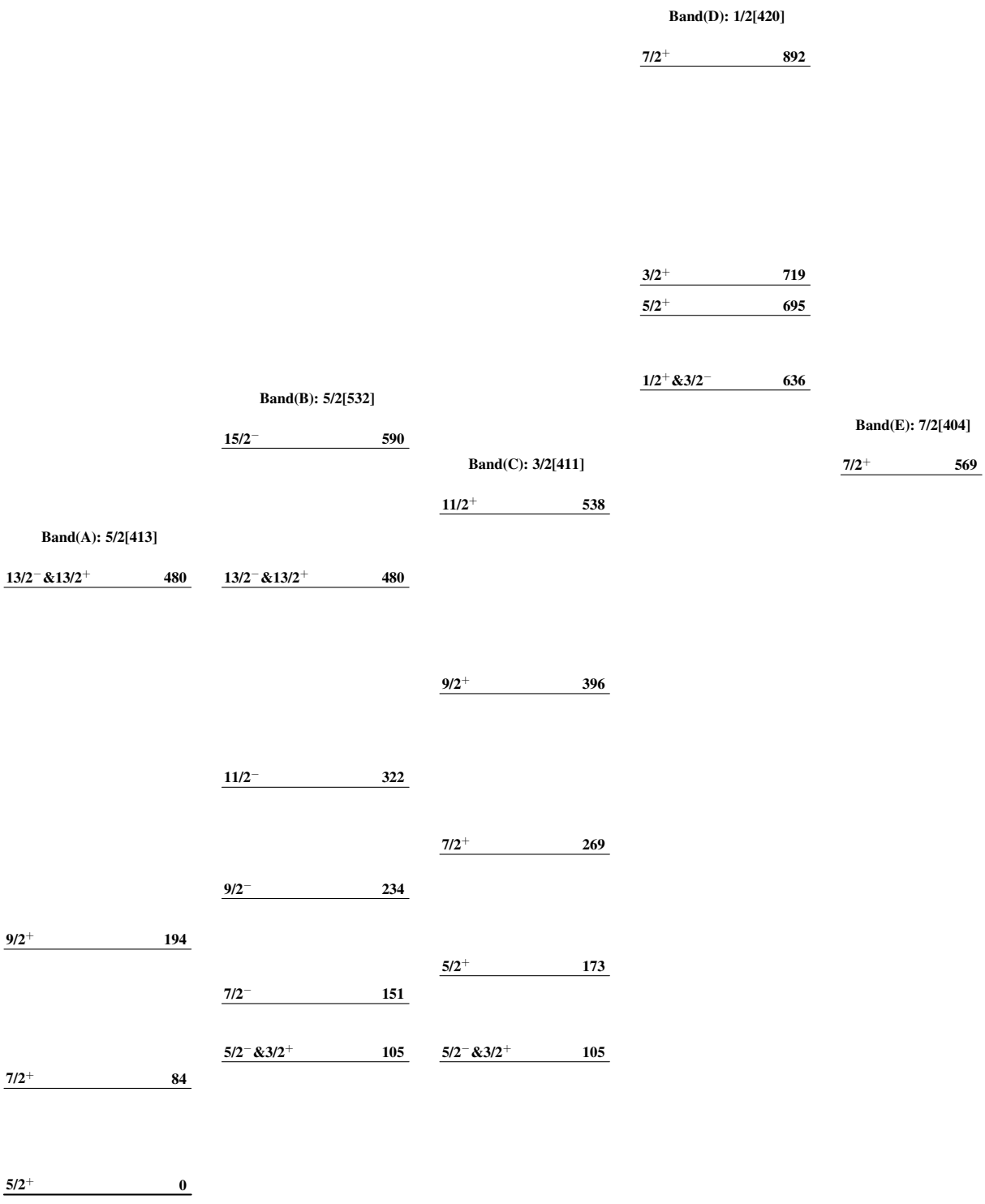
Continued on next page (footnotes at end of table)

^{154}Gd(t,α) 2005Bu02 (continued)

^{153}Eu Levels (continued)

† Experimental level energies are 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.
# From Adopted Levels for most of the levels.
@ The spectroscopic strengths are given as Nuclear Structure Factors, NSF=[dσ/dΩ(exp)]/[2N(dσ/dΩ(DWBA))], N=23. These values are compared with the calculated values for 'unmixed' and 'mixed' configurations given in table 3 of 2005Bu02.
& Band(A): 5/2[413].
a Band(B): 5/2[532].
b Band(C): 3/2[411].
c Band(D): 1/2[420].
d Band(E): 7/2[404].
e Band(F): 7/2[523].
f Band(G): 3/2[541].
g 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.

^{154}Gd(t,α) 2005Bu02



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

^{154}Gd(t,α) 2005Bu02 (continued)

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

(9/2$^-$) 1332

(5/2$^-$) 1225

Band(F): 7/2[523]

11/2$^-$ 1071

Band(G): 3/2[541]

11/2$^-$ 819

1/2$^+$ &3/2$^-$ 636

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