

¹⁵⁶Gd(³He,d), ¹⁵⁶Gd(α,t) 1972Bo47,1972Ti05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 132, 1 (2016)	4-Dec-2015

Data are from two measurements of ¹⁵⁶Gd(³He,d) and two of ¹⁵⁶Gd(α,t) (1972Bo47 and 1972Ti05). For both 1972Bo47 and 1972Ti05, E(³He) ≈ 25 MeV (FWHM ≈ 12 keV) and E(α) ≈ 26 MeV (FWHM ≈ 16 keV) with d and t measured in magnetic spectrographs. Other: S(p)=5521.7 25 (1975Bu02) and measured cross sections (1981Ow02).

Experimental methods:

1972Bo47: E(³He)=25.5 MeV and E(α)=27.0 MeV on enriched target. d and t measured in magnetic spectrograph with FWHM ≤ 20 keV.

1972Ti05: E(³He)=24 MeV and E(α)=25 MeV on enriched (93.58%) target. d and t measured in magnetic spectrograph, with FWHM ≤ 16 keV.

1975Bu02: p separation energy measured.

1981Ow02: E(³He)=35 MeV and E(α)=35 MeV on enriched (94%) target. d and t measured in magnetic spectrograph with FWHM=20-28 keV. Cross sections reported.

¹⁵⁷Tb Levels

Additional information 1.

E(level) [†]	J ^π [‡]	Comments
0.0 ^{&}	3/2 ⁺	
61 ^{&} 2	5/2 ⁺	
145 ^{&} 3	7/2 ⁺	
252 ^{&} 2	9/2 ⁺	E(level): Possible multiplet (1972Bo47).
324 ^b 3	5/2 ⁺	
357 ^a 3	7/2 ⁻	
408 ^b 2	7/2 ⁺	
426 ^a 3	9/2 ⁻	
517 ^a 3	11/2 ⁻	
595 ^d 3	1/2 ⁺	
635 ^d 3	3/2 ⁺	
658 ^e 3	7/2 ⁺	
694 ^d 4	5/2 ⁺	
710 [#] 3		
792 ^d 5	7/2 ⁺	
838 ^f 3	5/2 ⁺	
860 ^{@c} 3	11/2 ⁻	
888 ^g 3	(1/2 ⁻)	
924 ^g 3	(5/2 ⁻)	J ^π : 1972Bo47 assign 1/2 ⁺ and 3/2 ⁺ doublet from 1/2[411] fragment.
966 3	(1/2 ⁺ & 3/2 ⁻)	J ^π : 1972Ti05 assign 3/2 ⁻ , 1/2[541] and 1/2 ⁺ , 1/2[411]; 1972Bo47 assign 1/2 ⁻ , 1/2[541].
1005 ^h 3	(3/2 ⁺)	J ^π : 1972Bo47 assign 5/2 ⁻ , 1/2[541]. J ^π : No assignment in Adopted Levels.
1049 ^g 3	(9/2 ⁻)	J ^π : 1972Bo47 assign 5/2 ⁺ , 1/2[411]. J ^π : No assignment in Adopted Levels.
1067 [#] 4		J ^π : 1972Bo47 assign 7/2 ⁺ , 1/2[411].
1078 ^{@h} 3	(5/2 ⁺)	J ^π : No assignment in Adopted Levels.
1104 5		
1119 [@] 3		
1164 ^{@g} 3	(7/2 ⁻)	

Continued on next page (footnotes at end of table)

$^{156}\text{Gd}(^3\text{He,d}), ^{156}\text{Gd}(\alpha,t)$ 1972Bo47,1972Ti05 (continued) ^{157}Tb Levels (continued)E(level)[†]

1194 3
 1454 3
 1529[#] 3
 1541[#] 3
 1562[@] 3

[†] Average of values of 1972Bo47 and 1972Ti05 for both reactions.

[‡] Assignments are those of experimentors and are based on comparison of experimental and calculated (DWBA calculations including effects of pairing and Coriolis interaction) spectroscopic factors, systematics of the Nilsson states, and rotational band structure. The assignments of 1972Bo47 and 1972Ti05 agree below 850 keV; above that energy those of 1972Ti05 are given and those of 1972Bo47 which differ are in comments. Significant differences from the assignments in the Adopted Levels are noted.

[#] From 1972Bo47 only.

[@] From 1972Ti05 only.

[&] Band(A): 3/2(411) band.

^a Band(B): 5/2(532) band with mixture of 7/2(523).

^b Band(C): 5/2(413) band.

^c Band(D): 7/2(523) band with mixture of 5/2(532).

^d Band(E): γ -vibrational band based on 3/2(411) ground state with mixture 1/2[411] band.

^e Band(F): 7/2(404) bandhead.

^f Band(G): 5/2(402) bandhead.

^g Band(H): 1/2(541) state.

^h Band(I): 1/2(411) band fragment.

$^{156}\text{Gd}(^3\text{He,d}), ^{156}\text{Gd}(\alpha,t)$ 1972Bo47,1972Ti05Band(D): 7/2(523) band
with mixture of 5/2(532)11/2⁻ 860Band(E): γ -vibrational
band based on 3/2(411)
ground state with
mixture 1/2[411] band7/2⁺ 7925/2⁺ 694Band(F): 7/2(404)
bandhead7/2⁺ 6583/2⁺ 6351/2⁺ 595Band(B): 5/2(532) band
with mixture of 7/2(523)11/2⁻ 517

Band(C): 5/2(413) band

9/2⁻ 4267/2⁺ 4087/2⁻ 3575/2⁺ 324

Band(A): 3/2(411) band

9/2⁺ 2527/2⁺ 1455/2⁺ 613/2⁺ 0.0

 $^{156}\text{Gd}(\text{}^3\text{He,d}), ^{156}\text{Gd}(\alpha,t)$ 1972Bo47,1972Ti05 (continued)

Band(H): 1/2(541) state

(7/2⁻) 1164Band(I): 1/2(411) band
fragment(5/2⁺) 1078(9/2⁻) 1049(3/2⁺) 1005(5/2⁻) 924(1/2⁻) 888Band(G): 5/2(402)
bandhead5/2⁺ 838 $^{157}_{65}\text{Tb}_{92}$