

$^{156}\text{Gd}(p,t)$  1973FI04,2006Me25

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 200,2 (2025)	22-Aug-2022

**2006Me25:**  $^{156}\text{Gd}(p,t)$ ,  $E(p)=25$  MeV. Enriched target, enrichment not given. Outgoing tritons measured at  $5^\circ$ ,  $17.5^\circ$  and  $30^\circ$  using a Q3D magnetic spectrograph. FWHM=4-6 keV for  $E(t)=15-20$  MeV. Authors report and discuss only  $0^+$  states, which are identified from  $L=0$  transitions established from angular-distribution data. List 16 such states, three of which are tentative and 4 of which were previously known.

**2006Me13:** an earlier report from the same group as that of **2006Me25**.

**1973FI04:**  $^{156}\text{Gd}(p,t)$ ,  $E(p)=18$  MeV. Enriched ( $\geq 95\%$ ) target. Tritons detected using photographic plates in the focal plane of a magnetic spectrograph. FWHM=12 keV.  $t(\theta)$  measured at  $\theta=15, 22.5, 30, 37.5, 45, \text{ and } 60^\circ$ .

Other (p,t) studies: **1972EI07**; **1973Oo01**.

 $^{154}\text{Gd}$  Levels

In the tabulation of their results, **1973FI04** list levels at 1241, 1253, 1293, 1418 and 1509, but show only upper limits for their formation cross sections. The evaluator has thus assumed that these levels are not observably populated in (p,t) and have not included them here.

E(level) <sup>†</sup>	$J^\pi$ <sup>‡</sup>	L <sup>#</sup>	$(d\sigma/d\Omega)(\mu\text{b/sr})$ <sup>@</sup>	Comments
0&	$0^+$	0	2370 10	
123&	$2^+$	2		
371&	$4^+$	4		
680.4 <sup>a</sup> 3	$0^+$	0	513 2	E(level): <b>1973FI04</b> report E=681.
718	$6^+$	(6)		
816 <sup>a</sup>	$2^+$	2		
996 <sup>b</sup>	$2^+$	2		
1048 <sup>a</sup>	$4^+$	4		
1181.9 3	$0^+$	0	9.9 9	E(level): <b>1973FI04</b> report E=1190. <b>1980Sh08</b> , in (t,p), report E=1182.
1264 <sup>b</sup>	$4^+$	(4)		
1352.9 3	$0^+$	0	5.3 7	
1497.7 3	$0^+$	0	3.2 7	
1531 <sup>c</sup>	$2^+$	2		
1573.7 3	$0^+$	0	22.8 8	
1650.6 4	$0^+$	0	71 1	
1836.7 4	$0^+$	0	9.9 5	
1899.3 4	$0^+$	0	3.0 3	
1942.9 4	$0^+$	0	3.8 4	
2039.8 4	$0^+$	0	18.6 7	
2299.9? 5	$0^+$	0	20.0 8	
2485.1 5	$0^+$	0	3.7 4	
2585.3 5	$0^+$	0	33.7 9	
2744.5? 5	$0^+$	0	13.1 6	
2855.0? 5	$0^+$	0	4 2	

<sup>†</sup> Values reported to the nearest 0.1 keV are from **2006Me25**. Others are from **1973FI04**.

<sup>‡</sup> From deduced L values. These are consistent with the adopted values.

<sup>#</sup> Deduced from angular distribution of outgoing tritons. Some are given explicitly in **1973FI04**, others deduced by evaluator from  $J^\pi$  reported by **1973FI04**. Those of **2006Me25** are from DWBA analysis of angular-distribution data at angles of  $5^\circ$ ,  $17.5^\circ$  and  $30^\circ$ .

<sup>@</sup> Values are from **2006Me25**, at  $\theta=5^\circ$ . Authors also give data for  $17.5^\circ$  and  $30^\circ$ . **1973FI04** list cross-section values for several of the more strongly populated levels. See that reference for these values.

& Band(A):  $K^\pi=0^+$  ground-state band.

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 $^{156}\text{Gd}(\text{p,t})$  **1973F104,2006Me25 (continued)**

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 $^{154}\text{Gd}$  Levels (continued)

- <sup>a</sup> Band(B): First excited  $K^\pi=0^+$  band. Probable  $\beta$ -vibration.  
<sup>b</sup> Band(C):  $K^\pi=2^+$   $\gamma$ -vibrational band.  
<sup>c</sup> Band(D):  $K^\pi=2^+$  band.

$^{156}\text{Gd}(\text{p,t})$  1973FI04,2006Me25Band(D):  $K^\pi=2^+$  band2<sup>+</sup> 1531Band(C):  $K^\pi=2^+$   
 $\gamma$ -vibrational band4<sup>+</sup> 1264Band(B): First excited  
 $K^\pi=0^+$  band4<sup>+</sup> 10482<sup>+</sup> 9962<sup>+</sup> 8160<sup>+</sup> 680.4Band(A):  $K^\pi=0^+$   
ground-state band4<sup>+</sup> 3712<sup>+</sup> 1230<sup>+</sup> 0 $^{154}_{64}\text{Gd}_{90}$