

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	P. K. Joshi, B. Singh, S. Singh, A. K. Jain		NDS 138, 1 (2016)	15-Oct-2016

Q( $\beta^-$ )=8254 29; S(n)=2580 6; S(p)=12960 5Y; Q( $\alpha$ )=-1998 5 [2012Wa38](#)  
 Estimated uncertainty:  $\Delta S(p)$ =300 ([2012Wa38](#)).  
 S(2n)=7043 4, S(2p)=25000 500 (syst), Q( $\beta^-n$ )=3704 7 ([2012Wa38](#)).  
[1994Be24](#), [1998Do08](#): E=750 MeV/nucleon. Measured projectile fission fragment yields, mass, charge, and velocity distributions, and production  $\sigma$ . Fragment separator, energy-loss, tof techniques. [1998Do08](#) studied low-energy fission component features.  
 Mass measurements: [2013Va12](#): measured mass excess=-60191 keV 17 (CPT mass spectrometer), [2012Ha25](#) (JYFLTRAP Penning trap), [2004Ge18](#).  
[2007Ji14](#): calculated levels, J,  $\pi$ , pairing and quadrupole interaction.

<sup>139</sup>Te Levels

Cross Reference (XREF) Flags

A <sup>248</sup>Cm SF decay

E(level)	J $\pi^\dagger$	T <sub>1/2</sub>	XREF	Comments
0.0	(7/2 <sup>-</sup> )	1.6 s 3	A	$\% \beta^- = 100$ ; $\% \beta^- n = ?$ Theoretical T <sub>1/2</sub> =2.10 s, $\% \beta^- n = 26.6$ ( <a href="#">2003Mo09</a> ). Theoretical T <sub>1/2</sub> =0.115 s, $\% \beta^- n = 0.7$ ( <a href="#">2016Ma12</a> ). J $\pi$ : from the systematic trend of yrast excitations in N=87 isotones. Alternate assignment of 5/2 <sup>-</sup> is less likely since the 271 level fits the systematics for the 9/2 <sup>-</sup> levels in N=87 isotones and the 271 $\gamma$ has a stretched dipole character. <a href="#">2007Ji14</a> give 5/2 <sup>-</sup> from their theoretical calculations, also the same in <a href="#">2012Au07</a> from systematics. <a href="#">1997Mo25</a> give 3/2 <sup>-</sup> from theoretical predictions. T <sub>1/2</sub> : 1.6 s 3 from analysis of composite integral decay curve for <sup>139</sup> Sb, <sup>139</sup> Te, <sup>138</sup> Te and <sup>137</sup> I background ( <a href="#">2007ArZQ</a> thesis, same value also cited in <a href="#">2011Ar18</a> ). The statistics is very weak in the decay curve shown in figure 77 of <a href="#">2007ArZQ</a> . In the opinion of the evaluators this half-life should be viewed with caution. Systematic value=0.5 s ( <a href="#">2012Au07</a> ), and theoretical half-life=2.10 s ( <a href="#">2003Mo09</a> ). In <a href="#">2006KeZZ</a> (GSI annual report), half-life is listed as 598 ms 20 from integral $\beta$ counting, but in e-mail reply of Sept 29, 2008 from K.L. Kratz, the half-lives in the report were pointed out as questionable due to calibration issues. Perhaps based on this report, value of 0.60 s is listed in KAPL 2009 Wall Chart of Nuclides. Configuration= $\nu 2f_{7/2}^3 \otimes \nu i_{13/2}^2$ 0+. Configuration= $\nu 2f_{7/2}^2 \otimes \nu i_{13/2}^2$ 0+ $\otimes \nu 1h_{9/2}$ .
271.0 10	(9/2 <sup>-</sup> )		A	
627.5 $\ddagger$ 15	(13/2 <sup>-</sup> )		A	
1063.9 $\ddagger$ 18	(17/2 <sup>-</sup> )		A	
1598.7 $\ddagger$ 20	(21/2 <sup>-</sup> )		A	
2210.5 $\ddagger$ 23			A	

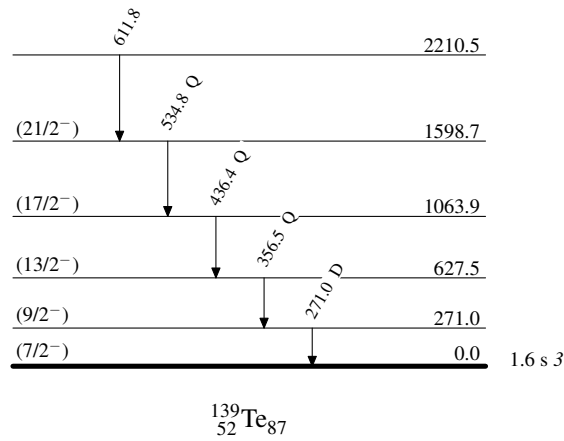
$\dagger$  From  $\gamma\gamma(\theta)$  data, assuming J $\pi$ (g.s.)=7/2<sup>-</sup> and  $\Delta\pi$ =no for stretched dipole and quadrupole transitions.

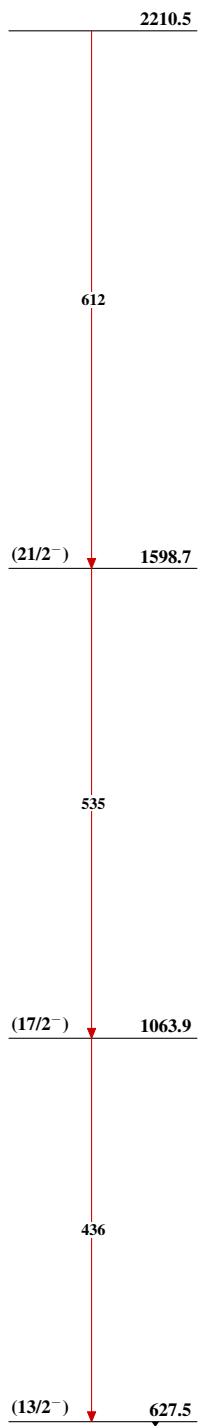
$\ddagger$  Band(A): Band built on (13/2<sup>-</sup>). Configuration= $\nu 1h_{9/2} \otimes$ (first 2<sup>+</sup> in <sup>138</sup>Te).

**Adopted Levels, Gammas (continued)** $\gamma(^{139}\text{Te})$ 

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$E_f$	$J_f^\pi$	Mult.†
271.0	(9/2 <sup>-</sup> )	271.0	0.0	(7/2 <sup>-</sup> )	D
627.5	(13/2 <sup>-</sup> )	356.5	271.0	(9/2 <sup>-</sup> )	Q
1063.9	(17/2 <sup>-</sup> )	436.4	627.5	(13/2 <sup>-</sup> )	Q
1598.7	(21/2 <sup>-</sup> )	534.8	1063.9	(17/2 <sup>-</sup> )	Q
2210.5		611.8	1598.7	(21/2 <sup>-</sup> )	

† From  $\gamma\gamma(\theta)$  in SF decay. Mult=Q and D indicate stretched quadrupole (most likely E2), and stretched dipole (most likely M1+E2), respectively.

**Adopted Levels, Gammas**Level Scheme

**Adopted Levels, Gammas****Band(A): Band built on  
(13/2<sup>-</sup>)** $^{139}_{52}\text{Te}_{87}$