

**Adopted Levels, Gammas**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	D. De Frenne	NDS 110,1745 (2009)	31-Dec-2008

Q( $\beta^-$ )=4532 10; S(n)=6.30×10<sup>3</sup> 3; S(p)=8343 10; Q( $\alpha$ )=-3465 11 [2012Wa38](#)  
 Note: Current evaluation has used the following Q record 4532 9 6301 268343 10-3462 11 [2003Au03](#).

<sup>102</sup>Tc Levels

Cross Reference (XREF) Flags

- A <sup>102</sup>Mo  $\beta^-$  decay
- B <sup>102</sup>Tc IT decay
- C <sup>100</sup>Mo(<sup>3</sup>He,p), <sup>104</sup>Ru(d, $\alpha$ )

E(level) <sup>†‡</sup>	J <sup><math>\pi</math></sup>	T <sub>1/2</sub>	XREF	Comments
0	1 <sup>+</sup>	5.28 s 15	ABC	% $\beta^-$ =100 J <sup><math>\pi</math></sup> : from log ft=4.78 to J <sup><math>\pi</math></sup> =0 <sup>+</sup> g.s. in <sup>102</sup> Ru. T <sub>1/2</sub> : from <a href="#">1967Vo09</a> . Other: <a href="#">1954FI21</a> .
0.0+x	(4,5)	4.35 min 7	B	% $\beta^-$ =98 2; %IT=2 2 %IT: A very weak it decay is proposed by <a href="#">1969B116</a> from the observation of a high-energy $\beta$ branch, which belongs to $\beta^-$ decay of <sup>102</sup> Tc (5.28 s). E(level): 300±200 keV is deduced from E $\beta$ measurements by <a href="#">1969B116</a> (see <sup>102</sup> Tc it decay). From the observed level density in ( <sup>3</sup> He,p) and (d, $\alpha$ ), this excitation energy becomes improbable as fast $\gamma$ -decay would be possible. However, as a high spin is proposed for a level at 20 keV, this level should be considered as a primary candidate for this isomeric state. J <sup><math>\pi</math></sup> : from $\beta$ -branches observed in <sup>102</sup> Tc $\beta^-$ decay (4.35 min) and $\gamma$ -deexcitation pattern of the levels fed. T <sub>1/2</sub> : from <a href="#">1970Hu02</a> . Other: <a href="#">1957FI14</a> .
20			C	E(level): may be same as the 4.35-min <sup>102</sup> Tc isomer (see its energy discussion). J <sup><math>\pi</math></sup> : from relative excitation probability in ( <sup>3</sup> He,p) and (d, $\alpha$ ), a high spin was proposed ( <a href="#">1982De03</a> ).
34?			C	J <sup><math>\pi</math></sup> : from relative excitation probability in ( <sup>3</sup> He,p) and (d, $\alpha$ ), a high spin was proposed ( <a href="#">1982De03</a> ).
174			C	
195			C	
211.66? 3	(0 <sup>+</sup> ,2 <sup>+</sup> )		A C	J <sup><math>\pi</math></sup> : based on assumption of M1 multipolarity of 211 $\gamma$ and the absence of $\beta^-$ branching to this level. E(level): the order of the 211.7 and 148.2 $\gamma$ 's is not well established. If the order is interchanged, there would be a level at 148.19 3 rather than at 211.66 3. The position at 211.66 keV is favored from the absence of some $\gamma$ -transitions (see <a href="#">1980De06</a> ) and the observation of a 213 level in <sup>104</sup> Ru(d, $\alpha$ ).
223.83 4	(1)		A	J <sup><math>\pi</math></sup> : log ft=5.8 from 0 <sup>+</sup> <sup>102</sup> Mo g.s.
248			C	
266.63 6	(0 <sup>+</sup> ,2 <sup>+</sup> )		A C	J <sup><math>\pi</math></sup> : 93.2 $\gamma$ [M1] from 1 <sup>+</sup> $\gamma$ rays involved and the absence of $\beta^-$ branching to this level.
298	(3 <sup>+</sup> )		C	J <sup><math>\pi</math></sup> : from L( <sup>3</sup> He,p)=(2+4).
315			C	
359.86 4	1 <sup>+</sup>		A C	J <sup><math>\pi</math></sup> : log ft=4.8 from 0 <sup>+</sup> <sup>102</sup> Mo g.s.
393			C	
416	(2 <sup>-</sup> )		C	J <sup><math>\pi</math></sup> : from L( <sup>3</sup> He,p)=(1+3).
443#			C	
472			C	
509			C	J <sup><math>\pi</math></sup> : see remark on 526 level.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) $^{102}\text{Tc}$  Levels (continued)

<u>E(level)<sup>†‡</sup></u>	<u>XREF</u>	<u>Comments</u>
526	C	$J^\pi$ : the angular distribution of the p group corresponding to the unresolved 509 and 526 levels is consistent with $L=(4+6)$ , $J^\pi=(5^+)$ .
573	C	
618	C	
637	C	
689#	C	
727#	C	
868	C	Unresolved multiplet is observed in ( $^3\text{He,p}$ ).

<sup>†</sup> Energy of levels observed in  $^{102}\text{Mo}$   $\beta^-$  decay calculated with a least-squares procedure using the adopted gammas.

<sup>‡</sup>  $\Delta E=10$  to 15 keV for levels observed in  $^{102}\text{Mo}(\text{}^3\text{He,p})$ ,  $^{104}\text{Ru}(d,\alpha)$ .

# Possible doublet.

 $\gamma(^{102}\text{Tc})$ 

<u><math>E_i(\text{level})</math></u>	<u><math>J_i^\pi</math></u>	<u><math>E_\gamma</math><sup>†</sup></u>	<u><math>I_\gamma</math><sup>‡</sup></u>	<u><math>E_f</math></u>	<u><math>J_f^\pi</math></u>
211.66?	(0 <sup>+</sup> ,2 <sup>+</sup> )	211.66 3	100	0	1 <sup>+</sup>
223.83	(1)	223.83 4	100	0	1 <sup>+</sup>
266.63	(0 <sup>+</sup> ,2 <sup>+</sup> )	42.85 8	30 7	223.83	(1)
		266.6 4	100 9	0	1 <sup>+</sup>
359.86	1 <sup>+</sup>	93.24 5	2.7 3	266.63	(0 <sup>+</sup> ,2 <sup>+</sup> )
		136.02 5	6.2 3	223.83	(1)
		148.19 3	100 5	211.66?	(0 <sup>+</sup> ,2 <sup>+</sup> )
		359.9 3	7.1 20	0	1 <sup>+</sup>

<sup>†</sup> Data are from  $^{102}\text{Mo}$   $\beta^-$  decay.

<sup>‡</sup> Branchings from each level, normalized to 100 for the strongest transition.

**Adopted Levels, Gammas****Level Scheme**

Intensities: Type not specified

## Legend

- ▶  $I_\gamma < 2\% \times I_\gamma^{\max}$
- ▶  $I_\gamma < 10\% \times I_\gamma^{\max}$
- ▶  $I_\gamma > 10\% \times I_\gamma^{\max}$

