

^{77}Ga β^- decay (13.2 s) [1977A117,1972MaWL](#)

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	30-Sep-2020

Parent: ^{77}Ga : $E=0.0$; $J^\pi=3/2^{-}$; $T_{1/2}=13.2$ s 2; $Q(\beta^-)=5220.5$ 24; $\% \beta^-$ decay=100.0

^{77}Ga - $J^\pi, T_{1/2}$: From ^{77}Ga Adopted Levels.

^{77}Ga - $Q(\beta^-)$: From [2017Wa10](#).

[1977A117](#), [1972MaWL](#): measured E_γ , I_γ , β , $\beta\gamma$.

[1974Gr29](#), [1970OsZZ](#): measured half-life of the decay of ^{77}Ga using $4\pi\beta$ -counting or delayed neutron-counting at the OSIRIS facility.

[1968Wi11](#): study of 17-s g.s. activity of ^{77}Ga and its branching ratio to feed the ^{77}Ge g.s. and ^{77}Ge isomer. Activity formed as a fission fragment from thermal neutron irradiation of ^{235}U , followed by chemical separation of fragments.

Mass-separated fission product.

[Additional information 1](#).

β , $\beta\gamma$ data are from [1986Ek01](#) and [1977A117](#).

778-keV and 1824-keV levels proposed by [1977A117](#) are omitted. The 1242 γ is placed from 1664-keV level which decays to 421-keV level as suggested by [2009Ka22](#) in $^{76}\text{Ge}(^{13}\text{C}, ^{12}\text{C}\gamma)$.

Total decay energy of 690 keV I deduced (by RADLIST code) from proposed decay scheme is much lower than the expected value of 5221 keV 3 , indicating that decay scheme is incomplete.

 ^{77}Ge Levels

E(level)	J^π [†]	$T_{1/2}$ [†]	Comments
0.0	$7/2^+$	11.211 h 3	
160.0 10	$1/2^-$		
420.9? 10	$5/2^+$		E(level): 581 level proposed by 1977A117 not confirmed by 2009Ka22 in $^{76}\text{Ge}(^{13}\text{C}, ^{12}\text{C}\gamma)$; 421 γ placed as g.s. transition.
619.0 13	$(3/2^+)$		
629.4 15	$3/2^-$		
1021.4 12	$3/2^-$		
1047.9 15	$(1/2, 3/2)$		
1358.9 17	$(1/2, 3/2, 5/2)$		
1663.6 13	$(1/2^+, 3/2)$		
2816.7 18	$(1/2$ to $7/2^-)$		

[†] From the Adopted Levels.

 β^- radiations

The level scheme is incomplete, thus no β feedings and log ft values can be deduced.

E(decay)	E(level)	Comments
(2404 3)	2816.7	E(decay): 3130 360 from $\beta(2187\gamma)$ (1986Ek01). Other: 2490 70 (1977A117).
(3557 3)	1663.6	E(decay): 3660 500 from $\beta(641\gamma)$ (1986Ek01). Other: 3790 310 (1977A117).
(3557 3)		E(decay): 3690 200 from $\beta(1242\gamma)$ (1977A117). Other: 3980 290 (1986Ek01). 1986Ek01 assumed that 1242 γ deexcited 1664 level rather than 1824 level as suggested in the previous work from the same laboratory (1977A117).
(4199 3)	1021.4	E(decay): 4060 420 (1977A117).
(4591 3)	629.4	E(decay): 4880 280 (1977A117). This β group may have a second component.
(5061 3)	160.0	E(decay): measured 5240 410 (1977A117).

^{77}Ga β^- decay (13.2 s) 1977Al17,1972MaWL (continued)

$\gamma(^{77}\text{Ge})$							Comments
E_γ †	I_γ †	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	
160.0 <i>IO</i>		160.0	1/2 ⁻	0.0	7/2 ⁺	(E3)	E_γ : γ and its placement from a 778-keV level is not confirmed in $^{76}\text{Ge}(^{13}\text{C}, ^{12}\text{C}\gamma)$ (2009Ka22).
^x 242.6 ‡ <i>IO</i>							
401.9 <i>IO</i>		1021.4	3/2 ⁻	619.0	(3/2 ⁺)		E_γ : placement from 2009Ka22 in $^{76}\text{Ge}(^{13}\text{C}, ^{12}\text{C}\gamma)$.
420.9 <i>IO</i>		420.9?	5/2 ⁺	0.0	7/2 ⁺		
458.6 <i>IO</i>	48	619.0	(3/2 ⁺)	160.0	1/2 ⁻		
469.4 <i>IO</i>	100	629.4	3/2 ⁻	160.0	1/2 ⁻		
618.2 <i>IO</i>		619.0	(3/2 ⁺)	0.0	7/2 ⁺		
641.4 <i>IO</i>		1663.6	(1/2 ⁺ , 3/2)	1021.4	3/2 ⁻		
739.9 <i>IO</i>		1358.9	(1/2, 3/2, 5/2)	619.0	(3/2 ⁺)		
861.4 <i>IO</i>		1021.4	3/2 ⁻	160.0	1/2 ⁻		
887.9 <i>IO</i>		1047.9	(1/2, 3/2)	160.0	1/2 ⁻		
1242.3 <i>IO</i>		1663.6	(1/2 ⁺ , 3/2)	420.9?	5/2 ⁺		
1504.4 <i>IO</i>		1663.6	(1/2 ⁺ , 3/2)	160.0	1/2 ⁻		
2187.3 <i>IO</i>		2816.7	(1/2 to 7/2 ⁻)	629.4	3/2 ⁻		

† Data are from 1972MaWL. ΔE assigned by the evaluators.

‡ Placement of transition in the level scheme is uncertain.

^x γ ray not placed in level scheme.

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Decay Scheme

Intensities: Relative I_γ

Legend

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

