

$^{32}\text{Mg} \beta^-$ decay (86 ms) [2004Gr08,1984Gu19](#)

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Christian Ouellet, Balraj Singh		NDS 112, 2199 (2011)	24-Aug-2011

Parent: ^{32}Mg : $E=0$; $J^\pi=0^+$; $T_{1/2}=86$ ms 5; $Q(\beta^-)=10150$ 90; $\% \beta^-$ decay=100.0

$^{32}\text{Mg}-Q(\beta^-)$: from [2011AuZZ](#). Others: 10110 90 ([2003Au03](#)), 10145 92 from measured mass excess= -915 20 ([2006Ga04](#), [2006Lu09](#)) for ^{32}Mg and mass excess= -11060 90 ([2003Au03](#)) for ^{32}Al .

$^{32}\text{Mg}-T_{1/2}$: from timing of (^{32}Mg fragment) γ coincidence ([2004Gr08](#)). Others: 120 ms 20 ([1984La03](#)), 85 ms 13 ([1995ReZZ](#)), [1999YoZW](#).

$^{32}\text{Mg}-\% \beta^-$ decay: $\% \beta^- n=5.5$ 5 ([2004Gr08](#)). Others: $\% \beta^- n=4.3$ 21 ([1995ReZZ](#), [2008ReZZ](#)), 2.4 5 ([1984La03](#)), 6 4 ([1999YoZW](#), preliminary).

[2004Gr08](#): source of ^{32}Mg from fragmentation of ^{36}S beam with Be target at GANIL. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$, delayed neutrons.

[1984La03](#), [1984Gu19](#): ^{32}Mg produced by $\text{Ir}(p,X)$ at 10 GeV proton energy at CERN-ISOLDE facility. Measured $E\gamma$, $I\gamma$, $\beta\gamma\gamma$, βn coin, isotopic half-life.

Others:

[1999YoZW](#): ^{32}Mg from ^9Be , $^{181}\text{Ta}(^{48}\text{Ca},X)$ $E=70$ MeV/nucleon, measured half-life and delayed neutron probability.

[1993KI02](#): source of ^{32}Mg from $\text{U}(p,X)$ at 600 MeV. Measured $E\gamma$, $\gamma\gamma$. Three γ rays of 735.5, 2466.9 and 2765.3 keV with coincidence relationship between 735 γ and 2467 γ established.

[1979De02](#): two observed γ rays of 731 2 ($I\gamma=36$ 15) and 2750 5 ($I\gamma=100$) possibly were from decay of ^{32}Mg .

All data are from [2004Gr08](#), unless otherwise stated.

From RADLIST code, deduced energy balance= 9207 keV 84 as compared to 9592 keV 96 from Q value and branching of 94.5% for population of levels in ^{32}Al by β^- decay.

 ^{32}Al Levels

<u>E(level)[†]</u>	<u>J^π[‡]</u>
0	1 ⁺
735.1 7	(2 ⁺)
956.7 9	(4 ⁺)
1178.6 11	(4 ⁻)
1743.5? 9	
2765.3 8	1 ⁺
3202.2 9	1 ⁺

[†] From least-squares fit to $E\gamma$'s, assuming 1 keV uncertainty when not stated.

[‡] From Adopted Levels.

 β^- radiations

<u>E(decay)</u>	<u>E(level)</u>	<u>$I\beta^-$^{†‡}</u>	<u>Log ft</u>	<u>Comments</u>
(6.95×10^3 9)	3202.2	10.7 10	4.4	av $E\beta=3237$ 46
(7.38×10^3 9)	2765.3	24.6 8	4.1	av $E\beta=3453$ 46
(1.015×10^4 9)	0	≈ 55	≈ 4.4	av $E\beta=4818$ 46

[†] From [2004Gr08](#).

[‡] Absolute intensity per 100 decays.

$^{32}\text{Mg} \beta^-$ decay (86 ms) [2004Gr08,1984Gu19](#) (continued) $\gamma(^{32}\text{Al})$

I $_{\gamma}$ normalization: [2004Gr08](#) give intensities per 100 decays of ^{32}Mg .

E_{γ}	$I_{\gamma}^{\ddagger}$	$E_i(\text{level})$	J_i^{π}	E_f	J_f^{π}	Comments
222 [#]	2.1 [#] 2	956.7	(4 ⁺)	735.1	(2 ⁺)	
222 [#]	2.1 [#] 2	1178.6	(4 ⁻)	956.7	(4 ⁺)	
565	0.6 1	1743.5?		1178.6	(4 ⁻)	
735.5 [†] 12	9.0 2	735.1	(2 ⁺)	0	1 ⁺	I $_{\gamma}$: other: 10.6 24 (1984Gu19). Additional information 1.
787	0.9 1	1743.5?		956.7	(4 ⁺)	
1743	≤ 2.8	1743.5?		0	1 ⁺	I $_{\gamma}$: also contributed by double escape of 2765 γ .
2030	1.4 3	2765.3	1 ⁺	735.1	(2 ⁺)	
2466.9 [†] 12	7.2 7	3202.2	1 ⁺	735.1	(2 ⁺)	I $_{\gamma}$: other: 4 2 (1984Gu19), (2467 γ)(735 γ) coin seen by 1993KI02 . Additional information 3.
2765.3 [†] 9	23.2 5	2765.3	1 ⁺	0	1 ⁺	I $_{\gamma}$: other: 25 1 (1984Gu19). Additional information 2.
3202	3.5 4	3202.2	1 ⁺	0	1 ⁺	

[†] From [1984Gu19](#). Corresponding value in [2004Gr08](#) is in agreement but less precisely quoted.

[‡] Absolute intensity per 100 decays.

[#] Multiply placed with undivided intensity.

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Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given

Legend

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

