^{23}Mg ε decay 2017Ma18,1974Ma41

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia[#], A. Chakraborty[##]	NDS 171,1 (2021)	1-Jun-2020

Parent: ^{23}Mg: E=0.0; $J^\pi=3/2^+$; $T_{1/2}$=11.3046 s *45*; Q(ε)=4056.179 *32*; %ε+%$β^+$ decay=100

^{23}Mg-Q(ε): From 2017Wa10 (2016-ame). Measured value: 4056.182 *32* (2019Ka30).

Others: 1960Ta14, 1968Go05, 1971De05, 1974Al03, 1977Az01.

2017Ma18: ^{23}Mg was produced from ^{23}Na(p,n) reaction, E=15,30 MeV; After mass separation, ^{23}Mg nuclides (contaminated only by ^{23}Na) were transported to the yield station and deposited on a Mylar tape (50 μm thickness and 1.25 cm width) for β particle and γ ray detection by plastic scintillator and HPGe detectors. The plastic scintillator was read out by two photomultipliers (PMs). The coincidence signals of these PMs were used to count the β+ particles and to trigger the data acquisition of the HPGe detector. Measured ^{23}Mg half-life from β(t), 440γ absolute emission probability, and deduced super-allowed β-transition branch g.s. to g.s. from feedings of ^{23}Na excited states.

1974Ma41: ^{23}Mg produced from ^{23}Na(p,n), Ep=10 MeV, reaction. Measured γ-ray branching, beta feedings.

^{23}Na Levels

E(level)[†]	J^π[†]	$T_{1/2}$
0.0	$3/2^+$	stable
440.2 *4*	$5/2^+$	
2390.9 *3*	$1/2^+$	

[†] From Adopted Levels.

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ [†]	Iε[†]	Log *ft*	I(ε+$β^+$)[†]	Comments
(1665.28 *30*)	2390.9	0.006 *1*	0.0006 *1*	4.97 *7*	0.007 *1*	av Eβ=257.56 *13*; εK=0.07526 *11*; εL=0.006435 *9*; εM+=0.0001907 *3* I(ε+$β^+$) – from 1974Ma41.
(3616.0 *4*)	440.2	7.84 *11*	0.00927 *16*	4.434 *6*	7.85 *11*	av Eβ=1143.84 *19*; εK=0.0010849 *5*; εL=9.270×10^{-5} *5*; εM+=2.747×10^{-6} *2* I(ε+$β^+$) – from γ intensity balance.
(4056.179 *32*)	0.0	92.08 *11*	0.0681 *7*	3.6675 *6*	92.15 *11*	av Eβ=1353.91; εK=0.0006797; εL=5.807×10^{-5}; εM+=1.721×10^{-6} Deduced by the evaluators (100 – g.s. feeding branch of 440.5γ. Other: 92.08 *14* (2017Ma18 – considering literature and their measured data).

[†] Absolute intensity per 100 decays.

γ(^{23}Na)

E_γ[†]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Comments
440.5 *6*	7.85 *11*	440.2	$5/2^+$	0.0	$3/2^+$	I_γ: Weighted average of 8.6 *3* (1968Go05), 8.1 *4* (1974Ma41), 7.79 *15* (1977Az01), and 7.805 *81* (2017Ma18). Other values: 9.1 *5* (1960Ta14), 9.1 *4* (1974Al03) – discrepant data omitted in the wt. average. 6 *3* (for rough check in 1971De05).
1950.6 *4*	0.0025[‡] *7*	2390.9	$1/2^+$	440.2	$5/2^+$	
2390.6 *4*	0.0044[‡] *7*	2390.9	$1/2^+$	0.0	$3/2^+$	

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^{23}Mg ε decay **2017Ma18,1974Ma41** **(continued)**

$\gamma(^{23}Na)$ (continued)

† From Adopted Gammas.
‡ From ε feeding and adopted γ-ray branching intensities.
# Absolute intensity per 100 decays.

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Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

Legend

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