^{25}Na β^- decay (59.3 s) 1982Al27,1971Al10

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia, Anagha Chakraborty	NDS 205,1 (2025)	31-May-2025

Parent: ^{25}Na: E=0.0; $J^\pi=5/2^+$; $T_{1/2}$=59.3 s *9*; Q(β^-)=3835.0 *12*; %β^- decay=100

1982Al27: Source produced by ^{23}Na(t,p) E=3.2 MeV. 40 sec irradiation followed by 60 sec counting. Ge(Li) detector – NaI(Tl) Compton-suppressed; measured Eγ, Iγ; deduced levels, β feeding.

1971Al10: Source produced by ^{23}Na(t,p) E=3.0 MeV. Thirty samples each 90 sec irradiation followed by transportation and counting; Ge(Li) and NaI(Tl) detectors, plastic scintillator; measured Eγ, Iγ, $\beta\gamma$ and $\gamma\gamma$ coin; deduced level scheme, spin, parity, I_β feeding.

Other references: 1944Ri01, 1955Ma63, 1956Na22, 1970Jo06.

^{25}Mg Levels

E(level)†	J^π‡	$T_{1/2}$
0	$5/2^+$	stable
585.042 *22*	$1/2^+$	3.38 ns *7*
974.749 *24*	$3/2^+$	11.2 ps *7*
1611.772 *11*	$7/2^+$	17 fs *3*
1964.620 *24*	$5/2^+$	0.69 ps *6*
2801.46 *3*	$3/2^+$	26 fs *3*

† Least-square fit to γ-ray energies.
‡ From Adopted Levels, Gammas.

β^- radiations

E(decay)	E(level)	Iβ^-†	Log *ft*	Comments
(1033.5 *16*)	2801.46	0.247 *14*	5.25 *3*	av Eβ=394.7 *5* Iβ^-: other: 0.3 *1* (1970Jo06).
(1870.4 *16*)	1964.620	0.440 *25*	6.05 *3*	av Eβ=772.6 *6* Iβ^-: other: 0.4 *1* (1970Jo06).
(2223.2 *16*)	1611.772	9.5 *6*	5.03 *3*	av Eβ=937.4 *6* Iβ^-: other: 8.8 *5* (1970Jo06).
(2860.3 *16*)	974.749	27.5 *16*	5.05 *3*	av Eβ=1239.6 *6* Iβ^-: other: 25.5 *5* (1970Jo06).
(3250.0 *16*)	585.042			Iβ^-: <1 (1970Jo06).
(3835.0 *19*)	0	62.5 *20*	5.254 *14*	av Eβ=1708.7 *6* Iβ^-: from 1971Al10 based on the β-γ coincidence measurements. Other: 65 (1955Ma63, 1970Jo06).

† Absolute intensity per 100 decays.

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$\gamma(^{25}Mg)$

Iγ normalization: from $\Sigma I\gamma(1+\alpha)$ to g.s.=37.5 *20* (100-62.5 *20* (I_β to the g.s.)).

E_γ [†]	I_γ [†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[#]	Comments
389.710 *35*	97.5 *17*	974.749	$3/2^+$	585.042	$1/2^+$	M1+E2	+0.13 *3*	9.71×10^{-5} *27*	%Iγ=12.6 *7* α(K)=9.10×10^{-5} *25*; α(L)=5.86×10^{-6} *16*; α(M)=2.17×10^{-7} *6* E_γ: others: 389.66 *9* (1971Al10), 390.7 *5* (1970Jo06). I_γ: relative branching from the level=48.0 *5* (1971Al10).
585.028 *30*	100.0 *14*	585.042	$1/2^+$	0	$5/2^+$	E2		9.44×10^{-5} *13*	%Iγ=13.0 *7* α(K)=8.85×10^{-5} *12*; α(L)=5.69×10^{-6} *8*; α(M)=2.101×10^{-7} *29* E_γ: others: 585.06 *8* (1971Al10), 585.9 *4* (1970Jo06).
836.841 *50*	0.800 *20*	2801.46	$3/2^+$	1964.620	$5/2^+$	M1(+E2)	<−0.25	1.96×10^{-5} *5*	%Iγ=0.104 *6* α(K)=1.84×10^{-5} *5*; α(L)=1.183×10^{-6} *29*; α(M)=4.38×10^{-8} *11* E_γ: other: 836.1 *12* (1971Al10). I_γ: relative branching from the level=41 *11* (1971Al10).
974.742 *35*	115.0 *17*	974.749	$3/2^+$	0	$5/2^+$	M1+E2	+0.34 *12*	1.52×10^{-5} *6*	%Iγ=14.9 *8* α(K)=1.42×10^{-5} *5*; α(L)=9.15×10^{-7} *35*; α(M)=3.39×10^{-8} *13* E_γ: others: 974.71 *12* (1971Al10), 975.2 *4* (1970Jo06). I_γ: relative branching from the level=52.0 *5* (1971Al10).
989.865 *30*	1.280 *24*	1964.620	$5/2^+$	974.749	$3/2^+$	M1+E2	−0.25 *7*	1.44×10^{-5} *3*	%Iγ=0.166 *9* α(K)=1.353×10^{-5} *30*; α(L)=8.69×10^{-7} *19*; α(M)=3.22×10^{-8} *7* E_γ: other: 990.1 *6* (1971Al10). I_γ: relative branching from the level=27 *4* (1971Al10).
1379.543 *30*	1.78 *4*	1964.620	$5/2^+$	585.042	$1/2^+$	E2		5.90×10^{-5} *8*	%Iγ=0.231 *13* α(K)=9.14×10^{-6} *13*; α(L)=5.87×10^{-7} *8*; α(M)=2.174×10^{-8} *30* α(IPF)=4.92×10^{-5} *7* E_γ: other: 1379.7 *5* (1971Al10). I_γ: relative branching from the level=44 *8* (1971Al10).
1611.716 *11*	72.9 *11*	1611.772	$7/2^+$	0	$5/2^+$	M1+E2	−0.207 *13*	1.05×10^{-4} *2*	%Iγ=9.4 *5* α(K)=5.59×10^{-6} *8*; α(L)=3.59×10^{-7} *5*; α(M)=1.331×10^{-8} *19* α(IPF)=9.94×10^{-5} *14* E_γ: listed in the abstract (1982Al27). Others: 1611.7 *2* (1971Al10) 1611.9 *4* (1970Jo06).

$^{25}_{12}Mg_{13}$-2

^{25}Na β^- decay (59.3 s) 1982Al27,1971Al10 (continued)

$\gamma(^{25}Mg)$ (continued)

E_γ [†]	I_γ [†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[#]	Comments
1964.501 *45*	1.128 *17*	1964.620	5/2$^+$	0	5/2$^+$	M1+E2	−0.58 *7*	2.51×10^{-4} *5*	%Iγ=0.146 *8* α(K)=4.14×10^{-6} *6*; α(L)=2.66×10^{-7} *4*; α(M)=9.86×10^{-9} *15* α(IPF)=0.000246 *5* E_γ: others: 1964.8 *6* (1971Al10), 1965.1 *9* (1970Jo06). I_γ: relative branching from the level=29 *3* (1971Al10).
2216.267 *50*	0.719 *16*	2801.46	3/2$^+$	585.042	1/2$^+$	M1+E2	+0.21 *9*	3.40×10^{-4} *6*	%Iγ=0.093 *5* α(K)=3.33×10^{-6} *5*; α(L)=2.136×10^{-7} *31*; α(M)=7.92×10^{-9} *12* α(IPF)=0.000337 *6* E_γ: others: 2215.7 *10* (1971Al10), 2215.6 *7* (1970Jo06). I_γ: relative branching from the level=38 *6* (1971Al10).
2801.312 *35*	0.380 *12*	2801.46	3/2$^+$	0	5/2$^+$	M1+E2	−0.64 *8*	6.14×10^{-4} *11*	%Iγ=0.0492 *31* α(K)=2.365×10^{-6} *34*; α(L)=1.518×10^{-7} *22*; α(M)=5.63×10^{-9} *8* α(IPF)=0.000612 *11* E_γ: others: 2800.9 *10* (1971Al10), 2800.6 *11* (1970Jo06). I_γ: relative branching from the level=21 *3* (1971Al10).

† From 1982Al27.
‡ From Adopted Gammas.
# Additional information 1.
@ For absolute intensity per 100 decays, multiply by 0.130 *7*.

$^{25}_{12}Mg_{13}$-3

^{25}Na β^- decay (59.3 s) 1982Al27,1971Al10

Decay Scheme

Intensities: I_γ per 100 parent decays