^{24}Si ε decay (141.3 ms) 2011Ic06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia, Anagha Chakraborty	NDS 186, 2 (2022)	31-Mar-2022

Parent: ^{24}Si: E=0; $J^\pi=0^+$; $T_{1/2}$=141.3 ms *15*; Q(ε)=10794 *19*; %ε+%$β^+$ decay=100.0

^{24}Si-$T_{1/2}$: From Adopted Levels of ^{24}Si.

^{24}Si-Q(ε): From 2021Wa16.

Other references: 2016Su22, 2015Su15, 2009Ic05, 2009Ic06, 2001Ba07, 1999Bl08, 1998Ba53, 1998Cz01, 1997Cz02, 1981Ay01, 1979Ay01.

2011Ic06: ^{24}Si produced by fragmentation of an E=100 MeV beam of ^{28}Si in ^{9}Be(^{28}Si,X) reaction. Reaction fragments were collected and analyzed using RIPS facility at RIKEN. Clover-type germanium detector and eight BGO counters, a plastic β veto counter. Protons were detected and separated from β′s using the ΔE-E method. Four ΔE-E detectors, each consisting of a gas ΔE detector and silicon E detectors. Measured Eγ, Iγ, β, βγ coin, E(p), I(p). 2009Ic05 and 2009Ic06 from same research group.

2016Su22, 2015Su15: ^{24}Si source obtained from fragmentation of a 75.8 MeV/nucleon primary beam of ^{28}Si on ^{9}Be target. Reaction fragments were separated and identified by means of energy-loss and time-of-flight (tof). Two DSSDs and Clover HPGe detectors. Measured E(p), I(p), βγ-coin, pγ-coin, β-proton coin. Deduced β-delayed proton decay branching ratios, ^{24}Si half-life.

2001Ba07: Source produced by ^{9}Be(^{28}Si,x) E=100 MeV/A. Projectile fragment separator, Si E-ΔE detector, tof.

Excited states above 2000 keV mainly decay by proton emission.

^{24}Al Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0	4^+	2.053 s *4*	
425.81 *10*	1^+	130.7 ms *13*	E(level): From Eγ.
1088.3 *2*	1^+		E(level): From Eγ.
2991 *21*	1^+		
3364 *13*	1^+		
4389 *10*	1^+		
4700 *8*	1^+		
4976 *9*	1^+		
5382 *11*	(1^+)		
5801 *50*	1^+		
5953 *8*	0^+		E(level): Other: 5954 *6* (1981Ay01 − superseded 5955 *10* (1979Ay01)).
6243 *12*	1^+		
6487 *12*	1^+		
6735 *12*	1^+		

† From 2011Ic06, except where otherwise noted.

‡ From Adopted Levels.

ε,$β^+$ radiations

E(decay)	E(level)	I$β^+$ ‡	Iε‡	Log *ft*	I(ε+$β^+$)†‡	Comments
(4059 *23*)	6735	0.07 *2*	$9.\times10^{-5}$ *3*	4.87 *13*	0.07 *2*	av Eβ=1357 *11*; εK=0.00115 *3*; εL=0.0001018 *2*; εM+=8.16×10^{-6} *19*
(4307 *23*)	6487	0.26 *4*		4.45 *7*	0.26 *4*	av Eβ=1476 *11*
(4551 *23*)	6243	2.2 *2*	0.0018 *2*	3.66 *5*	2.2 *2*	av Eβ=1594 *11*; εK=0.000734 *14*; εL=6.51×10^{-5} *13*; εM+=5.22×10^{-6} *10*
(4841 *21*)	5953	9.9 *9*	0.0063 *6*	3.17 *5*	9.9 *9*	av Eβ=1734 *10*; εK=0.000581 *10*; εL=5.15×10^{-5} *9*; εM+=4.13×10^{-6} *7*
(4.99×10^{3} *5*)	5801	1.0 *3*		4.24 *14*	1.0 *3*	av Eβ=1808 *26*
(5412 *22*)	5382	0.68 *10*		4.61 *7*	0.68 *10*	av Eβ=2011 *11*
(5818 *21*)	4976	0.8 *1*		4.71 *6*	0.8 *1*	av Eβ=2210 *11*

Continued on next page (footnotes at end of table)

^{24}Si ε decay (141.3 ms) 2011Ic06 (continued)

ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*	I(ε+β+)†‡	Comments
(6094 *21*)	4700	1.1 *1*		4.69 *4*	1.1 *1*	av Eβ=2345 *10*
(6405 *22*)	4389	0.49 *7*		5.16 *7*	0.49 *7*	av Eβ=2497 *11*
(7430 *23*)	3364	11 *1*	0.0015 *1*	4.16 *4*	11 *1*	av Eβ=3002 *12*; εK=0.0001251 *1*; εL=1.110×10^{-5} *12*; εM+=8.89×10^{-7} *10*
(7.80×10^{3} *3*)	2991	5.8 *7*		4.55 *6*	5.8 *7*	av Eβ=3186 *14*
(9706 *19*)	1088.3	23.9 *15*	0.00133 *9*	4.45 *3*	23.9 *15*	av Eβ=4126 *11*; εK=5.08×10^{-5} *4*; εL=4.51×10^{-6} *4*; εM+=3.61×10^{-7} *3*
(10368 *19*)	425.81	41 *4*	0.00184 *20*	4.36 *5*	41.0 *44*	av Eβ=4456 *11*; εK=4.09×10^{-5} *3*; εL=3.623×10^{-6} *25*; εM+=2.904×10^{-7} *20*

† From 2011Ic06. For levels above 2000 keV based on measured proton intensity for levels and assuming no γ-ray deexcitation. For 1st excited state at 425 based on Iγ (not listed) and %IT=69.6 *7* and for 2nd excited state at 1090 based on Iγ (not listed).
‡ Absolute intensity per 100 decays.

γ(^{24}Al)

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α†	Comments
425.81 *10*	425.81	1+	0	4+	[M3]	1.14×10^{-3}	α(K)=0.001067 *15*; α(L)=7.36×10^{-5} *11*; α(M)=3.90×10^{-6} *6* E_γ: From Adopted Gammas. 426 in 2011Ic06.
662.5 *2*	1088.3	1+	425.81	1+			E_γ: From Adopted Gammas. 664 in 2011Ic06.

† Additional information 1.

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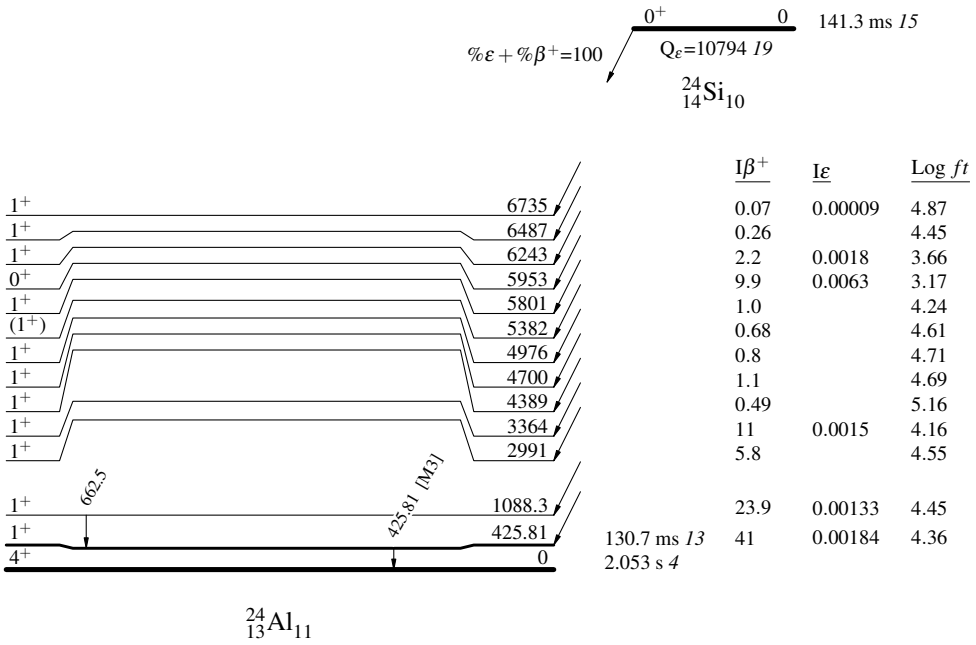
Decay Scheme



	Iβ+	Iε	Log *ft*
	0.07	0.00009	4.87
	0.26		4.45
	2.2	0.0018	3.66
	9.9	0.0063	3.17
	1.0		4.24
	0.68		4.61
	0.8		4.71
	1.1		4.69
	0.49		5.16
	11	0.0015	4.16
	5.8		4.55
	23.9	0.00133	4.45
	41	0.00184	4.36