^{30}P $\varepsilon+\beta^+$ decay 1980Wi13,1973Go13,1974Al09

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia, A. Chakraborty	NDS 197,1 (2024)	31-May-2024

Parent: ^{30}P: E=0; $J^\pi=1^+$; $T_{1/2}$=2.500 min *2*; Q(ε)=4232.11 *6*; %ε+%β^+ decay=100

^{30}P-J^π,$T_{1/2}$: from ^{30}P Adopted Levels.

^{30}P-Q(ε): from 2021Wa16.

1980Wi13: ^{30}P was produced from ^{27}Al(α,n)^{30}P reaction, E=10.0 MeV, 99.999% pure aluminum; Ge(Li) detector; Measured: Eγ, Iγ per 100 decay.

1973Go13: ^{30}P was produced by irradiating 99.5% pure phosphine, PH_3, with bremsstrahlung radiation from the 100 MeV electron beam; gas-flow technique, Ge(Li) detector; Measured the weak positron branching in the decay of ^{30}P.

1974Al09: ^{30}P was produced from ^{30}Si(p,n)^{30}P reaction, E=10 MeV; Ge(Li) detector; Measured ^{30}P β^+ branch.

^{30}Si Levels

E(level)[†]	J^π[‡]	$T_{1/2}$
0	0^+	stable
2235.33 *2*	2^+	236 fs *12*
3498.50 *3*	2^+	61 fs *6*
3769.48 *4*	1^+	42 fs *9*
3787.73 *5*	0^+	8.9 ps *9*

[†] From a least squares fit to the γ-ray energies.

[‡] From the Adopted Levels.

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ [†]	Iε[†]	Log *ft*	I($\varepsilon+\beta^+$)[†]	Comments
(444.4 *10*)	3787.73		0.0034 *3*	4.48 *4*	0.0034 *3*	εK=0.9090; εL=0.08295; εM+=0.008035
(462.6 *10*)	3769.48		0.00018 *2*	5.79 *5*	0.00018 *2*	εK=0.9090; εL=0.08292; εM+=0.008032
(733.6 *10*)	3498.50		0.0015 *2*	5.27 *6*	0.0015 *2*	εK=0.9093; εL=0.08272; εM+=0.008011
(1996.8 *10*)	2235.33	0.052 *3*	0.0027 *2*	5.884 *24*	0.055 *3*	av Eβ=402.62; εK=0.045038 *9*; εL=0.0040853 *8*; εM+=0.0003955 I($\varepsilon+\beta^+$): other: 0.087 *9* reported by 1973Go13, assuming the 2235 γ-ray contribution through the ε decay to the 2nd and 3rd excited state is negligible.
(4232.1 *14*)	0	99.804 *3*	0.1358 *14*	4.8395 *4*	99.940 *3*	av Eβ=1441.00; εK=0.001236; εL=0.0001120; εM+=1.084×10^{-5} I($\varepsilon+\beta^+$): Others: 99.94 (1974Al09), 99.91 (1973Go13) and 99.5 (1956Mo93).

[†] Absolute intensity per 100 decays.

γ(^{30}Si)

E$_\gamma$[†]	I$_\gamma$[‡@]	E$_i$(level)	J_i^π	E$_f$	J_f^π	Mult.[†]	δ[†]	α[#]	Comments
1263.13 *3*	0.00081 *8*	3498.50	2^+	2235.33	2^+	M1+E2	+0.18 *6*	2.90×10^{-5} *5*	α(K)=1.359×10^{-5} *20*; α(L)=9.70×10^{-7} *15*; α(M)=6.39×10^{-8} *10* α(IPF)=1.438×10^{-5} *24*
1534.12 *4*	0.00010 *2*	3769.48	1^+	2235.33	2^+	M1+E2	−0.09 *4*	8.40×10^{-5} *12*	α(K)=9.60×10^{-6} *13*; α(L)=6.85×10^{-7} *10*;

Continued on next page (footnotes at end of table)

^{30}P $\varepsilon+\beta^+$ decay 1980Wi13,1973Go13,1974Al09 (continued)

$\gamma(^{30}Si)$ (continued)

E_γ[†]	I_γ[‡@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[#]	Comments
								α(M)=4.52×10^{-8} *6* α(IPF)=7.37×10^{-5} *10*
1552.36 *4*	0.0034 *3*	3787.73	0$^+$	2235.33	2$^+$	E2	1.21×10^{-4} *2*	α(K)=1.121×10^{-5} *16*; α(L)=8.00×10^{-7} *11*; α(M)=5.27×10^{-8} *7* α(IPF)=0.0001091 *15*
2235.23 *2*	0.059 *3*	2235.33	2$^+$	0	0$^+$	E2	4.36×10^{-4} *6*	α(K)=5.65×10^{-6} *8*; α(L)=4.03×10^{-7} *6*; α(M)=2.66×10^{-8} *4* α(IPF)=0.000429 *6* I_γ: weighted average of 0.059 *3* (1980Wi13) and 0.061 *6* (1974Al09). Other: Iγ=0.087 *9* (1973Go13).
3498.33 *5*	0.00066 *8*	3498.50	2$^+$	0	0$^+$	E2	9.94×10^{-4} *14*	α(K)=2.75×10^{-6} *4*; α(L)=1.960×10^{-7} *27*; α(M)=1.292×10^{-8} *18* α(IPF)=0.000991 *14*
3769.22 *5*	0.00008 *1*	3769.48	1$^+$	0	0$^+$	M1	9.49×10^{-4} *13*	α(K)=2.371×10^{-6} *33*; α(L)=1.691×10^{-7} *24*; α(M)=1.115×10^{-8} *16* α(IPF)=0.000947 *13*

[†] From Adopted Gammas.
[‡] Deduced by the evaluators from γ-branching ratios of the adopted dataset, except where otherwise noted.
[#] Additional information 1.
[@] Absolute intensity per 100 decays.

^{30}P ε decay 1980Wi13,1973Go13,1974Al09

Decay Scheme

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