^{30}S $\varepsilon+\beta^+$ decay   1980Wi13

History

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

Parent: ^{30}S: E=0; $J^\pi=0^+$; $T_{1/2}$=1.1798 s *6*; Q(ε)=6141.60 *20*; %ε+%β^+ decay=100

^{30}S-$T_{1/2}$: from ^{30}S Adopted Levels.

^{30}S-Q(ε): from 2021Wa16. Other: 6141.61 keV *19* (2011So11).

1980Wi13: ^{30}S was produced from ^{28}Si(^{3}He,n)^{30}S reaction; E=10.0 MeV; natural silicon target; Ge(Li) detector; Measured: Eγ, absolute Iγ intensity.

Others: 1961Ro30, 1963Fr10, 1966Ga16, 1971Mo27, 1980WiZQ.

^{30}P Levels

E(level)[†]	J^π[‡]	$T_{1/2}$[‡]	Comments
0	1^+	2.500 min *2*	$T_{1/2}$: other: 2.498 min *4* (1980Wi13).
677.01 *3*	0^+	93 fs *10*	
708.70 *3*	1^+	34 ps *2*	
3019.2 *1*	1^+	2 fs *1*	

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

[‡] From Adopted Levels.

ε,β^+ radiations

E(decay)	E(level)	Iβ^+[‡]	Iε[‡]	Log ft	I($\varepsilon+\beta^+$)[†‡]	Comments
(3122.4 *10*)	3019.2	2.27 *5*	0.0138 *3*	3.553 *10*	2.28 *5*	av Eβ=915.17 *11*; εK=0.005506 *2*; εL=0.0005088 *2*; εM+=5.683×10^{-5} *2*
(5432.9 *10*)	708.70	0.29 *7*		5.89 *11*	0.29 *7*	av Eβ=2022.95
(5464.6 *10*)	677.01	76.1 *4*	0.0494 *6*	3.4871 *23*	76.1 *4*	av Eβ=2038.39; εK=0.0005889; εL=5.4386×10^{-5} *8*; εM+=6.0752×10^{-6} *9* I($\varepsilon+\beta^+$): based on assumed partial half-life of 1.5485 s *67* for the superallowed Fermi branch in 1980Wi13. Others: 77.5 *10* (1971Mo27), 80 *1* (1963Fr10).
(6141.6 *14*)	0	21.3 *5*	0.00908 *23*	4.324 *11*	21.3 *5*	av Eβ=2369.13; εK=0.0003867; εL=3.5705×10^{-5} *5*; εM+=3.9884×10^{-6} *5* I($\varepsilon+\beta^+$): others: 19.4 *10* (1971Mo27), 20 *1* (1963Fr10).

[†] From 1980Wi13. %I($\varepsilon+\beta^+$) to 677 was determined by measuring the half-life and comparing it to the calculated half-life for the 0^+ to 0^+ superallowed Fermi branch in the decay (1980Wi13). %I($\varepsilon+\beta^+$) to g.s. was determined using the ratio of %I($\varepsilon+\beta^+$) (g.s.)/%I($\varepsilon+\beta^+$) (677 keV) in (1980Wi13).

[‡] Absolute intensity per 100 decays.

$\gamma(^{30}$P)

Eγ[†]	Iγ[‡&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[#]	α[@]	Comments
677.1 *1*	78.4 *4*	677.01	0^+	0	1^+	D			Eγ: other: 678 *2* (1966Ga16). Iγ: deduced from the reported β^+ feeding to this level and γ-ray feeding from 3019-keV level.
708.7 *1*	0.29 *7*	708.70	1^+	0	1^+	M1+E2	+0.28 *+29−22*	5.7×10^{-5} *8*	α(K)=5.3×10^{-5} *8*; α(L)=3.9×10^{-6} *6*; α(M)=3.0×10^{-7} *4*

^{30}S $\varepsilon+\beta^+$ decay　　1980Wi13 (continued)

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

E_γ[†]	I_γ[‡&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[@]	Comments
2342.3 8	2.28 5	3019.2	1^+	677.01	0^+	M1+E2	0.00044 5	α(K)=6.13×10^{-6} 26; α(L)=4.56×10^{-7} 20; α(M)=3.46×10^{-8} 15 α(IPF)=0.00044 5

[†] From Adopted Gammas.
[‡] Relative to the %Iγ(677) in 1980Wi13. %Iγ(677) was obtained from the %I($\varepsilon+\beta^+$) to 677 of 1980Wi13.
[#] From adopted data set.
[@] Additional information 1.
[&] Absolute intensity per 100 decays.

^{30}S ε decay   1980Wi13

Decay Scheme

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

Legend

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

0^+ 0 1.1798 s 6

$\%\varepsilon + \%\beta^+ = 100$ $Q_\varepsilon = 6141.60\ 20$

$^{30}_{16}S_{14}$

		$I\beta^+$	$I\varepsilon$	Log ft
1^+ 3019.2	2 fs 1	2.27	0.0138	3.553
1^+ 708.70	34 ps 2	0.29		5.89
0^+ 677.01	93 fs 10	76.1	0.0494	3.4871
1^+ 0	2.500 min 2	21.3	0.00908	4.324

2342.3 M1+E2 2.28

708.7 M1+E2 0.29

677.1 D 78.4

$^{30}_{15}P_{15}$