^{57}Ni β^+ decay 1990Sc23

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. R. Bhat	NDS 85, 415 (1998)	24-Sep-1998

Parent: ^{57}Ni: E=0.0; $J^\pi=3/2^-$; $T_{1/2}$=35.60 h *6*; Q(β^+)=3264.2 *26*; %β^+ decay=100.0

1990Sc23,1991HeZZ: Eγ, Iγ, $\gamma\gamma$ coincidences.

1982Gr10: Eγ, Iγ, $T_{1/2}$.

1969Ga14: Eγ, Iγ, $\gamma\gamma$ coincidences.

1967Li08: Eγ, Iγ.

1958Ko60: Eγ, Iγ, NaI(Tl) detector; β^+ spectrum measurement with a long lens spectrometer, conversion electron data, Fermi-Kurie analysis, ε/β^+ ratios from proportional counter.

1991HeZZ has corrections of three misprints in the γ-ray intensities given in 1990Sc23 and correction of one error as well as variance-covariance matrices of γ-ray intensities.

Others: 1977Au04 and 1970Ra51.

^{57}Co Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0.0	$7/2^-$		
1224.01 *3*	$9/2^-$		
1377.65 *5*	$3/2^-$	19 ps *4*	g=+2.0 (1970Va10) $T_{1/2}$: from $\beta\gamma$(t) (1967Be17,scin). g: $\gamma\gamma(\theta$,h). Other: + 1.9 *6* (1967Be17).
1504.81 *4*	$1/2^-$	0.21 ns *2*	$T_{1/2}$: from $\beta\gamma$(t) (1971Ch43). Other: 0.60 ns *5* (1967Ba10,Xγ(t)).
1757.58 *3*	$3/2^-$		
1897.45 *3*	$7/2^-$		
1919.55 *5*	$5/2^-$		
2133.08 *5*	$5/2^-$		
2730.91 *4*	$3/2^-$,5/2		
2804.27 *4*	$(3/2^-$,5/2)		
3108.12 *7*	$(3/2)^-$		
3177.41 *4*	$5/2^-$,$7/2^-$		

† From 1990Sc23.
‡ From Adopted Levels.

ε,β^+ radiations

IB,IE,TI From intensity balance at each level.

Iβ^+(EL=1378)/Iβ^+(EL=1505)=7.1 *5* (1958Ko60); this decay scheme gives a discrepant value 5.0 *2*.

εL/εK= 0.100 *6* (1967Wi17,pc).

E(decay)	E(level)	Iβ^+‡	Iε‡	Log *ft*	I($\varepsilon+\beta^+$)‡	Comments
(87 *3*)	3177.41		0.0208 *11*	6.06 *4*	0.0208 *11*	εK=0.8710; εL=0.1096 *5*; εM+=0.01941 *10*
(156 *3*)	3108.12		0.060 *3*	6.13 *3*	0.060 *3*	εK=0.8792; εL=0.10274 *14*; εM+=0.01805 *3*
(460 *3*)	2804.27		0.291 *8*	6.41 *1*	0.291 *8*	εK=0.8855; εL=0.09753; εM+=0.01701
(533 *3*)	2730.91		0.0199 *7*	7.70 *2*	0.0199 *7*	εK=0.8859; εL=0.09717; εM+=0.01694
(1131 *3*)	2133.08		0.0340 *19*	8.13 *2*	0.0340 *19*	εK=0.8868; εL=0.09597; εM+=0.01671
(1345 *3*)	1919.55	0.444 *20*	11.9 *4*	5.74 *2*	12.3 *4*	av Eβ=139.0 *11*; εK=0.8554 *9*; εL=0.09239 *10*; εM+=0.016079 *18*
(1507 *3*)	1757.58	0.80 *4*	4.86 *18*	6.22 *2*	5.66 *21*	av Eβ=206.5 *11*; εK=0.7617 *20*; εL=0.08218 *22*; εM+=0.01430 *4*

Continued on next page (footnotes at end of table)

^{57}Ni β^+ decay 1990Sc23 (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+‡	Iε‡	Log *ft*	I($\varepsilon+\beta^+$)‡	Comments
1734† *15*	1504.81	7.04 *22*	10.0 *3*	6.05 *1*	17.0 *5*	av Eβ=313.7 *11*; εK=0.5198 *25*; εL=0.0560 *3*; εM+=0.00975 *5*
1871† *10*	1377.65	35.3 *13*	29.2 *11*	5.64 *2*	64.5 *22*	av Eβ=368.7 *11*; εK=0.4025 *22*; εL=0.04335 *23*; εM+=0.00754 *4*

† Q(ε)=3243 *7* from these Eβ′s and value adopted by 1977Wa08 disagrees with the current Q(ε)= 3264.2 *26* (1995Au04).
‡ Absolute intensity per 100 decays.

$\gamma(^{57}Co)$

Iγ normalization: from ΣIγ(to g.s.)=100 with the assumption that g.s. β^+ feeding is zero. The uncertainty was calculated using the variance-covariance matrix of γ-ray intensities in 1991HeZZ.
I$\gamma(\gamma^{\pm})$/Iγ(1378γ)=0.97 *12* (1967Li08) consistent with 1.07 from this decay scheme.

E$_\gamma$†	I$_\gamma$‡@	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.#	δ#	α#	Comments
127.164 *3*	20.4 *4*	1504.81	1/2$^-$	1377.65	3/2$^-$	M1+E2	+0.008 *14*	0.0221 *1*	α(K)=0.0194 *1*; α(L)=0.00196 α(K)exp=0.023 *3*; K/L=9 *4* (1958Ko60,1956Ko01)
161.86 *3*	0.0278 *8*	1919.55	5/2$^-$	1757.58	3/2$^-$	(M1)		0.0118	α(K)=0.0105; α(L)=0.0010
252.5		1757.58	3/2$^-$	1504.81	1/2$^-$				
304.1 *1*	0.0024 *7*	3108.12	(3/2)$^-$	2804.27	(3/2$^-$,5/2)				
379.94 *2*	0.082 *2*	1757.58	3/2$^-$	1377.65	3/2$^-$				
541.9 *1*	0.0045 *6*	1919.55	5/2$^-$	1377.65	3/2$^-$				
673.44 *4*	0.0601 *8*	1897.45	7/2$^-$	1224.01	9/2$^-$	(M1+E2)	+0.02 *1*		
696.0 *4*	0.0011 *8*	1919.55	5/2$^-$	1224.01	9/2$^-$				
755.3 *1*	0.0066 *8*	2133.08	5/2$^-$	1377.65	3/2$^-$	M1+E2	−0.35 *+18−9*		
906.98 *5*	0.075 *2*	2804.27	(3/2$^-$,5/2)	1897.45	7/2$^-$	D			
1046.68 *3*	0.164 *4*	2804.27	(3/2$^-$,5/2)	1757.58	3/2$^-$	D			
1224.00 *4*	0.077 *3*	1224.01	9/2$^-$	0.0	7/2$^-$	M1+E2	+0.26 *1*		
1279.99 *6*	0.0118 *9*	3177.41	5/2$^-$,7/2$^-$	1897.45	7/2$^-$				
1350.52 *6*	0.0024 *12*	3108.12	(3/2)$^-$	1757.58	3/2$^-$				
1377.63 *3*	100 *2*	1377.65	3/2$^-$	0.0	7/2$^-$	(E2)			
1603.28 *6*	0.0048 *8*	3108.12	(3/2)$^-$	1504.81	1/2$^-$				
1730.44 *6*	0.064 *3*	3108.12	(3/2)$^-$	1377.65	3/2$^-$				
1757.55 *3*	7.04 *20*	1757.58	3/2$^-$	0.0	7/2$^-$	E2			
1897.42 *4*	0.034 *3*	1897.45	7/2$^-$	0.0	7/2$^-$	(M1(+E2))	−0.04 *22*		
1919.52 *5*	15.0 *3*	1919.55	5/2$^-$	0.0	7/2$^-$	M1+E2	−0.23 *3*		
2133.04 *5*	0.035 *2*	2133.08	5/2$^-$	0.0	7/2$^-$	(M1(+E2))	0.00 *5*		
2730.91 *4*	0.0243 *6*	2730.91	3/2$^-$,5/2	0.0	7/2$^-$	D,E2			
2804.20 *3*	0.120 *4*	2804.27	(3/2$^-$,5/2)	0.0	7/2$^-$	D,E2			
3177.28 *5*	0.0136 *7*	3177.41	5/2$^-$,7/2$^-$	0.0	7/2$^-$				

† From 1990Sc23.
‡ Relative intensity from 1990Sc23 as corrected by 1991HeZZ.
# From adopted gammas.
@ For absolute intensity per 100 decays, multiply by 0.817 *17*.

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Decay Scheme

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