^{61}Fe β^- decay (5.98 min) 1975Br04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Kazimierz Zuber, Balraj Singh	NDS 125, 1 (2015)	25-Jan-2015

Parent: ^{61}Fe: E=0; J^π=(3/2$^-$); $T_{1/2}$=5.98 min *6*; Q(β^-)=3977.1 *28*; %β^- decay=100.0

^{61}Fe-J^π,$T_{1/2}$: From Adopted Levels of ^{61}Fe.

^{61}Fe-Q(β^-): From 2012Wa38.

1975Br04: Measured Eγ, Iγ, $\gamma\gamma$ coin, $\gamma\gamma$ anti-coin, γ(t), semi.

1967Gu06: Measured Eγ, Iγ, β spectra, $\gamma\gamma$, $\beta\gamma$ coin, half-life of ^{61}Fe seven γ rays reported.

1967Gr15: Measured ^{61}Fe half-life, γ and β spectra, $\beta\gamma$ and $\gamma\gamma$ coin, seven γ rays reported.

1967Eh02: Measured Eγ, Iγ, $\gamma\beta$ coin.

1966St11: Measured Eγ, Iγ, ^{61}Fe half-life.

Source produced by ^{64}Ni(n,α) (1984Qa04,1968Ka22,1966St11), ^{64}Ni(d,αp) (1978LeZA) and W(^{82}Se,X) (1985Ru05).

1957Ri10: ^{61}Fe produced in bombardment of Ni and Cu targets with 20 MeV neutrons and 28 MeV deuterons, measured half-life, β, γ.

From RADLIST code, deduced total decay energy is 4032 keV *174* is consistent with Q(β^-)=3977 keV *3*, which suggests that the decay scheme is reasonably complete.

^{61}Co Levels

E(level)[†]	J^π[‡]	Comments
0.0	7/2$^-$	
1027.49 *8*	3/2$^-$	
1205.10 *8*	(3/2)$^-$	
1285.72 *21*	(9/2)$^-$	
1325.41 *9*	(1/2$^-$)	
1618.88 *17*	5/2$^-$,7/2$^-$	
1645.89 *11*	(3/2$^-$,5/2)	
1889.0 *3*	(5/2,7/2)$^-$	J^π: note that 7/2 is inconsistent with log *ft*=7.5 from (3/2$^-$).
1953.20 *16*	1/2$^-$,3/2$^-$	
2011.50 *14*	(3/2,5/2)$^-$	
2230.9 *3*	(5/2,7/2)$^-$	
2303.00 *16*	1/2$^-$,3/2$^-$	
2431.5 *4*	(3/2,5/2)$^-$	
2484.5 *4*	(3/2,5/2)$^-$	
2754.5 *4*	(3/2$^-$,5/2)	
2864.39 *17*	(3/2,5/2)$^-$	
2920.1 *5*	(3/2$^-$,5/2)	
3000.30 *20*	(3/2,5/2)$^-$	
3104.4 *5*	(1/2,3/2,5/2)	
3191.1 *6*	(3/2$^-$,5/2)	
3204.7 *3*	(3/2$^-$,5/2$^-$)	
3239.2 *6*	(3/2$^-$,5/2)	
3365.0 *7*	(3/2$^-$,5/2)	

[†] From least-squares fit to Eγ data.

[‡] From Adopted Levels.

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β^- radiations

E(decay)	E(level)	Iβ^-[†][‡]	Log *ft*	Comments
(612 *3*)	3365.0	0.042 *9*	6.2 *1*	av Eβ=205.2 *12*
(738 *3*)	3239.2	0.055 *13*	6.4 *1*	av Eβ=255.4 *12*
(772 *3*)	3204.7	0.62 *8*	5.39 *6*	av Eβ=269.4 *12*
(786 *3*)	3191.1	0.080 *14*	6.3 *1*	av Eβ=275.0 *12*
(873 *3*)	3104.4	0.071 *22*	6.5 *2*	av Eβ=310.9 *12*
(977 *3*)	3000.30	1.30 *17*	5.45 *6*	av Eβ=354.8 *12*
(1057 *3*)	2920.1	0.067 *14*	6.9 *1*	av Eβ=389.1 *13*
(1113 *3*)	2864.39	1.19 *13*	5.70 *5*	av Eβ=413.2 *13*
(1223 *3*)	2754.5	0.74 *10*	6.07 *6*	av Eβ=461.3 *13*
(1493 *3*)	2484.5	0.118 *15*	7.21 *6*	av Eβ=581.7 *13*
(1546[#] *3*)	2431.5	<0.17	>7.1	av Eβ=605.7 *13*
(1674 *3*)	2303.00	1.53 *21*	6.30 *6*	av Eβ=664.2 *13*
(1746[#] *3*)	2230.9	<0.10	>7.6	av Eβ=697.2 *13*
(1966 *3*)	2011.50	4.8 *5*	6.09 *5*	av Eβ=798.6 *13*
(2024 *3*)	1953.20	0.95 *11*	6.85 *5*	av Eβ=825.7 *13*
(2088 *3*)	1889.0	0.24 *5*	7.5 *1*	av Eβ=855.6 *14*
(2331 *3*)	1645.89	7.6 *6*	6.20 *4*	av Eβ=969.7 *14* E(decay): measured value: 2500 *100* (Iβ=13%) (1967Gu06).
(2358 *3*)	1618.88	0.18 *8*	7.9 *2*	av Eβ=982.4 *14*
(2652 *3*)	1325.41	26.3 *24*	5.90 *4*	av Eβ=1121.3 *14* E(decay): measured value: 2630 *100* (Iβ=54%) (1967Gu06).
(2691[#] *3*)	1285.72	<0.05	>8.6	av Eβ=1140.2 *14*
(2772 *3*)	1205.10	35.4 *22*	5.85 *3*	av Eβ=1178.6 *14* E(decay): measured value: 2800 *100* (Iβ=31%) (1967Gu06).
(2950 *3*)	1027.49	15 *3*	6.3 *1*	av Eβ=1263.3 *14* E(decay): measured values: 2850 *70* (1967Gu06), 2860 (1967Eh02).
(3977[#] *3*)	0.0	<10	>7.1	av Eβ=1758.0 *14* Iβ^-: from counting of β^- and γ (1967Eh02).

[†] From I(γ+ce) intensity imbalance at each level.
[‡] Absolute intensity per 100 decays.
[#] Existence of this branch is questionable.

$\gamma(^{61}Co)$

Iγ normalization: from Σ I(γ+ce) to g.s.=95 *5*, assuming <10% β feeding to g.s..

E$_\gamma$	I$_\gamma$[†][‡]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	α[#]
120.34 *12*	12.2 *9*	1325.41	(1/2$^-$)	1205.10	(3/2)$^-$	[M1+E2]	0.14 *12*
177.61 *12*	4.6 *4*	1205.10	(3/2)$^-$	1027.49	3/2$^-$	[M1+E2]	0.03 *3*
297.90 *7*	51 *4*	1325.41	(1/2$^-$)	1027.49	3/2$^-$		
333.0 *4*	0.51 *8*	1618.88	5/2$^-$,7/2$^-$	1285.72	(9/2)$^-$		
349.7 *3*	0.37 *9*	2303.00	1/2$^-$,3/2$^-$	1953.20	1/2$^-$,3/2$^-$		
440.5 *4*	0.50 *10*	1645.89	(3/2$^-$,5/2)	1205.10	(3/2)$^-$		
542.6[@] *5*	0.15 *7*	2431.5	(3/2,5/2)$^-$	1889.0	(5/2,7/2)$^-$		
561.4[@] *5*	0.13 *6*	2864.39	(3/2,5/2)$^-$	2303.00	1/2$^-$,3/2$^-$		
603.3 *5*	0.17 *7*	1889.0	(5/2,7/2)$^-$	1285.72	(9/2)$^-$		
618.40 *16*	2.14 *17*	1645.89	(3/2$^-$,5/2)	1027.49	3/2$^-$		
657.3 *4*	0.51 *22*	2303.00	1/2$^-$,3/2$^-$	1645.89	(3/2$^-$,5/2)		
686.0 *3*	0.92 *18*	2011.50	(3/2,5/2)$^-$	1325.41	(1/2$^-$)		

Continued on next page (footnotes at end of table)

^{61}Fe β^- decay (5.98 min) 1975Br04 (continued)

$\gamma(^{61}Co)$ (continued)

E_γ	I_γ [†‡]	E_i(level)	J_i^π	E_f	J_f^π
696.9 *4*	0.26 *7*	3000.30	$(3/2,5/2)^-$	2303.00	$1/2^-,3/2^-$
748.10 *18*	1.85 *17*	1953.20	$1/2^-,3/2^-$	1205.10	$(3/2)^-$
769.4 *5*	0.37 *9*	3000.30	$(3/2,5/2)^-$	2230.9	$(5/2,7/2)^-$
806.3 *4*	0.44 *11*	2011.50	$(3/2,5/2)^-$	1205.10	$(3/2)^-$
925.6 *3*	0.78 *9*	1953.20	$1/2^-,3/2^-$	1027.49	$3/2^-$
945.4 *5*	0.25 *7*	2230.9	$(5/2,7/2)^-$	1285.72	$(9/2)^-$
978[@]	0.17 *9*	2303.00	$1/2^-,3/2^-$	1325.41	$(1/2^-)$
984.1 *4*	1.4 *3*	2011.50	$(3/2,5/2)^-$	1027.49	$3/2^-$
989.2 *4*	1.4 *3*	3000.30	$(3/2,5/2)^-$	2011.50	$(3/2,5/2)^-$
1027.42 *11*	98 *5*	1027.49	$3/2^-$	0.0	$7/2^-$
1097.8 *2*	1.60 *13*	2303.00	$1/2^-,3/2^-$	1205.10	$(3/2)^-$
1205.07 *12*	100	1205.10	$(3/2)^-$	0.0	$7/2^-$
1275	1.4 *3*	2303.00	$1/2^-,3/2^-$	1027.49	$3/2^-$
1285.7 *3*	0.85 *13*	1285.72	$(9/2)^-$	0.0	$7/2^-$
1381.4 *3*	0.92 *11*	3000.30	$(3/2,5/2)^-$	1618.88	$5/2^-,7/2^-$
1403.9 *5*	0.27 *12*	2431.5	$(3/2,5/2)^-$	1027.49	$3/2^-$
1538.8 *3*	0.63 *11*	2864.39	$(3/2,5/2)^-$	1325.41	$(1/2^-)$
1618.9 *2*	0.84 *10*	1618.88	$5/2^-,7/2^-$	0.0	$7/2^-$
1645.95 *16*	16.0 *8*	1645.89	$(3/2^-,5/2)$	0.0	$7/2^-$
1659.3 *2*	1.78 *20*	2864.39	$(3/2,5/2)^-$	1205.10	$(3/2)^-$
1837.2 *6*	0.32 *7*	2864.39	$(3/2,5/2)^-$	1027.49	$3/2^-$
1879.4 *4*	0.60 *8*	3204.7	$(3/2^-,5/2^-)$	1325.41	$(1/2^-)$
1889.0 *4*	0.41 *8*	1889.0	$(5/2,7/2)^-$	0.0	$7/2^-$
1899.3 *5*	0.17 *5*	3104.4	(1/2,3/2,5/2)	1205.10	$(3/2)^-$
1972.7 *5*	0.14 *4*	3000.30	$(3/2,5/2)^-$	1027.49	$3/2^-$
1999.8 *8*	0.30 *10*	3204.7	$(3/2^-,5/2^-)$	1205.10	$(3/2)^-$
2011.6 *2*	10.1 *7*	2011.50	$(3/2,5/2)^-$	0.0	$7/2^-$
2177.1 *7*	0.48 *10*	3204.7	$(3/2^-,5/2^-)$	1027.49	$3/2^-$
2230.8 *4*	0.25 *4*	2230.9	$(5/2,7/2)^-$	0.0	$7/2^-$
2484.4 *4*	0.28 *3*	2484.5	$(3/2,5/2)^-$	0.0	$7/2^-$
2754.4 *4*	1.76 *20*	2754.5	$(3/2^-,5/2)$	0.0	$7/2^-$
2920.0 *5*	0.16 *3*	2920.1	$(3/2^-,5/2)$	0.0	$7/2^-$
3191.0 *6*	0.19 *3*	3191.1	$(3/2^-,5/2)$	0.0	$7/2^-$
3204.2 *6*	0.10 *2*	3204.7	$(3/2^-,5/2^-)$	0.0	$7/2^-$
3239.1 *6*	0.13 *3*	3239.2	$(3/2^-,5/2)$	0.0	$7/2^-$
3364.9 *7*	0.10 *2*	3365.0	$(3/2^-,5/2)$	0.0	$7/2^-$

† Relative intensity normalized to Iγ(1205.07γ)=100.

‡ For absolute intensity per 100 decays, multiply by 0.420 *24*.

Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

@ Placement of transition in the level scheme is uncertain.

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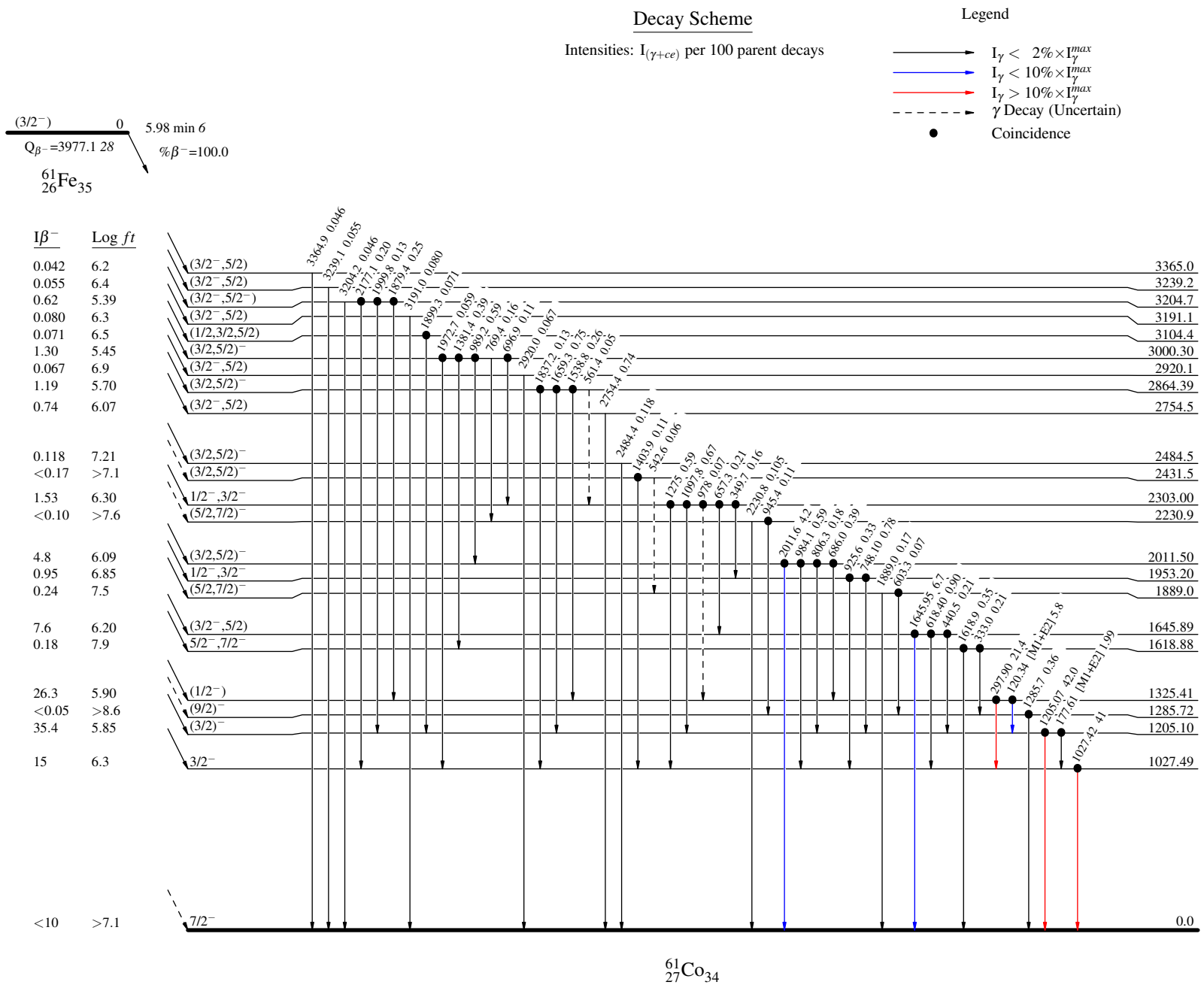
Decay Scheme

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



$^{61}_{27}Co_{34}$-4