^{55}Co ε decay 1977Mi21,1970Lu14

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Huo Junde	NDS 109, 787 (2008)	30-Apr-2007

Parent: ^{55}Co: E=0.0; $J^\pi=7/2^-$; $T_{1/2}$=17.53 h *3*; Q(ε)=3451.8 *4*; %ε+%$β^+$ decay=100.0

1977Mi21: sources produced by irradiating high-purity Fe foils by proton beam at 45 MeV for 3 hours; chemically separated; measured Eγ, Iγ with Ge(Li) detector (resolution: 2.1 keV at 1332 keV).

1970Lu14: measured Eγ, Iγ, and γγ, compared the levels in ^{55}Fe obtained in different decay studies and by the use of different reaction techniques, then established decay scheme.

1966Fi06: sources produced by irradiating enriched Fe foils by deuterons beam at 9-MeV, chemically separated; measured Eγ, Iγ with Ge(Li) detector, measured β spectrum with a magnetic spectrometer.

Adopted decay scheme is taken mainly from 1970Lu14.

^{55}Fe Levels

E(level)	J^π†	E(level)	J^π†	E(level)	J^π†	E(level)	J^π†
0.0	$3/2^-$	1316.62 *17*	$7/2^-$	2212.2 *3*	$9/2^-$	2872.3 *3*	$5/2^-,7/2^-$
411.39 *23*	$1/2^-$	1408.50 *18*	$7/2^-$	2301.3 *3*	$(9/2^-)$	2939.0 *4*	$(5/2,7/2)^-$
931.27 *17*	$5/2^-$	2144.0 *3*	$5/2^-$	2578.8 *6*	$5/2^-$	3108.7 *3*	$(5/2,7/2)^-$

† Value from Adopted Levels.

ε,$β^+$ radiations

For positron measurements, see 1966Fi06. See also 1939La06, 1949De02, 1954Ca18, 1958Mu11, and 1962Ba27.
For measurements of $β^+$ asymmetry from decay of polarized ^{55}Co, see 1961Po04.

E(decay)	E(level)	Iβ+ †	Iε†	Log *ft*	I(ε+β+)†	Comments
(343.1 *5*)	3108.7		0.38 *4*	5.67 *5*	0.38 *4*	εK= 0.8858; εL= 0.09719; εM+= 0.01704
(512.8 *6*)	2939.0		0.10 *1*	6.60 *5*	0.10 *1*	εK= 0.8870; εL= 0.09614; εM+= 0.01683
(579.5 *5*)	2872.3		0.18 *1*	6.456 *25*	0.18 *1*	εK= 0.8873; εL= 0.09589; εM+= 0.01679
(873.0 *7*)	2578.8		0.043 *5*	7.44 *5*	0.043 *5*	εK= 0.8881; εL= 0.09527; εM+= 0.01666
(1150.5 *5*)	2301.3	0.0039 *5*	3.4 *4*	5.78 *5*	3.4 *3*	av Eβ= 57.65 *21*; εK= 0.8874; εL= 0.09487; εM+= 0.01658
(1239.6 *5*)	2212.2	0.0178 *13*	1.85 *13*	6.11 *3*	1.87 *16*	av Eβ= 94.53 *21*; εK= 0.8801; εL= 0.09401; εM+= 0.01643
(1307.8 *5*)	2144.0	0.0149 *19*	0.54 *7*	6.69 *6*	0.56 *8*	av Eβ= 122.61 *21*; εK= 0.8648; εL= 0.09233; εM+= 0.01614
2059 *5*	1408.50	25.6 *15*	10.7 *6*	5.785 *25*	36.4 *23*	av Eβ= 435.68 *20*; εK= 0.2613; εL= 0.02780; εM+= 0.004856
(2135.2 *4*)	1316.62	4.26 *20*	1.34 *7*	6.724 *21*	5.6 *4*	av Eβ= 476.22 *20*; εK= 0.2129; εL= 0.02264; εM+= 0.003956
2535 *2*	931.27	46 *3*	5.6 *4*	6.25 *3*	52 *3*	av Eβ= 648.98 *20*; εK= 0.09693; εL= 0.01030; εM+= 0.001799

† Absolute intensity per 100 decays.

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γ(^{55}Fe)

Iγ normalization: based on assumption of no decay feeding to ^{55}Fe ground state and adopted decay scheme.
For other γ-ray measurements, see 1949De02, 1954Ca18, 1958Mu11, 1962Ba27, 1965Ha23, 1966Fi06, 1967St23, 1972McZA, 1975BaXN, and 1982Gr10.
β+γ are from 1954Ca18, 1958Mu11, 1962Ba27; see also 1949De02.
The measurements of γ(θ,H,t) and linear polarization as well as β+γ circular polarization; see 1960Ba06, 1961Ch12, 1968Sa15, and 1973Ca06.
α(K)exp and Ice from 1966Fi06; for other Ice measurements, see also 1949De02 and 1954Ca18. 1958Mu11 measured E(ce).

E_γ †	I_γ ‡&	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ@	Comments
91.9 *2*	1.55 *9*	1408.50	7/2⁻	1316.62	7/2⁻			α(K)exp>0.017 ce(L)+ce(M)>0.000065.
385.4 *3*	0.72 *5*	1316.62	7/2⁻	931.27	5/2⁻	M1		α(K)exp=0.00085 *7* ce(L)+ce(M)=0.0000005 *3*.
411.5 *3*	1.43 *9*	411.39	1/2⁻	0.0	3/2⁻	M1+E2		α(K)exp=0.0013 *4* ce(L)+ce(M)=0.0000011 *4*. Mult.: 1966Fi06 estimated M1+(≤50%)E2.
477.2 *2*	26.9 *19*	1408.50	7/2⁻	931.27	5/2⁻	M1+E2		α(K)exp=0.00084 *9* ce(L)+ce(M)=0.0000156 *8*. Mult.: 1966Fi06 estimated M1+(9-33%)E2. δ: −0.04 *1* or −4.1 *2* (1973Ca06).
520.0 *3*	1.1 *1*	931.27	5/2⁻	411.39	1/2⁻	E2		α(K)exp=0.00135 *50* ce(L)+ce(M)=0.0000008 *4*. 1966Fi06 pointed out 520γ's α(K)exp was roughly by estimated value (the 520γ was not resolved from the 511γ).
803.7 *2*	2.49 *17*	2212.2	9/2⁻	1408.50	7/2⁻	M1		α(K)exp=0.00022 *4*
827.0 *4*	0.28 *8*	2144.0	5/2⁻	1316.62	7/2⁻			
931.1 *3*	100	931.27	5/2⁻	0.0	3/2⁻	M1+E2	+0.40 *3*	α(K)exp=0.000164 *18* ce(L)+ce(M)=0.0000137 *10*. δ: weighted average from +0.37 *4* (1961Ch12) and +0.42 *4* (1968Sa15). Other: +0.36 *11* (1960Ba20).
984.6 *3*	0.69 *13*	2301.3	(9/2⁻)	1316.62	7/2⁻			
1212.8 *3*	0.35 *4*	2144.0	5/2⁻	931.27	5/2⁻			
1316.6 *3*	9.45 *13*	1316.62	7/2⁻	0.0	3/2⁻	E2		α(K)exp=0.000090 *14* ce(L)+ce(M)=0.0000006 *2*. Mult.: from adopted γ radiations.
1370.0 *3*	3.89 *29*	2301.3	(9/2⁻)	931.27	5/2⁻	E2		α(K)exp=0.000089 *14* ce(L)+ce(M)=0.00000026 *7*. Mult.: from adopted γ radiations.
1408.5 *3*	22.5 *1*	1408.50	7/2⁻	0.0	3/2⁻	E2		α(K)exp=0.000073 *5* ce(L)+ce(M)=0.00000144 *31*.
1556.0 *4*	0.061 *13*	2872.3	5/2⁻,7/2⁻	1316.62	7/2⁻			
1622.3 *4*	0.060 *7*	2939.0	(5/2,7/2)⁻	1316.62	7/2⁻			
1792.1 *3*	0.109 *17*	3108.7	(5/2,7/2)⁻	1316.62	7/2⁻			
1940.6 *4*	0.019 *8*	2872.3	5/2⁻,7/2⁻	931.27	5/2⁻			
2144.2 *6*	0.12 *1*	2144.0	5/2⁻	0.0	3/2⁻			
2177.6 *6*	0.39 *5*	3108.7	(5/2,7/2)⁻	931.27	5/2⁻			
2578.7 *6*	0.057 *7*	2578.8	5/2⁻	0.0	3/2⁻			
2872.4 *6*	0.157 *8*	2872.3	5/2⁻,7/2⁻	0.0	3/2⁻			
2938.9 *5*	0.076 *13*	2939.0	(5/2,7/2)⁻	0.0	3/2⁻			
3108.3 *6*	0.007 *3*	3108.7	(5/2,7/2)⁻	0.0	3/2⁻			

† From 1977Mi21.

Continued on next page (footnotes at end of table)

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γ(^{55}Fe) (continued)

‡ Photon intensities from 1977Mi21 were renormalized by evaluator to give Iγ(931γ)=100.
# From 1966Fi06 and 1970Lu14, except as noted.
@ Phase convention from 1970Kr03.
& For absolute intensity per 100 decays, multiply by 0.750 *35*.

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Decay Scheme

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