^{63}Fe β^- decay (6.1 s) 1985Ru05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 196,17 (2024)	30-Sep-2023

Parent: ^{63}Fe: E=0.0; $J^\pi=5/2^-$; $T_{1/2}$=6.1 s *6*; Q(β^-)=6216 *19*; %β^- decay=100

^{63}Fe-J^π,$T_{1/2}$: From Adopted Levels of ^{63}Fe. Adopted $T_{1/2}$ is taken from 1985Ru05 (superseding 4.9 s *5* in an earlier measurement in 1983Ru06).

^{63}Fe-Q(β^-): From 2021Wa16.

1985Ru05: ^{63}Fe source was produced via W(^{82}Se,X) with E=11.5 MeV/nucleon ^{82}Se beam from the UNILAC accelerator on a 46 mg/cm^2 natural tungsten target at GSI. Fragments were separated with the GSI on-line mass separator and transported to a measuring position inside a 4π plastic β-detector between two opposite Ge detectors. Measured Eγ, Iγ, $\beta\gamma$-coin, $\gamma\gamma$-coin. Deduced levels, J, π, β-decay branching ratios, log *ft*. Comparisons with available data. See also 1983Ru06 from the same lab for an earlier measurement using W(^{76}Ge,X) E=9 MeV/nucleon, which is superseded by 1985Ru05.

The decay scheme is considered incomplete due to a large gap between Q-value=6216 and the highest observed level at E=3422 and unplaced γ transitions.

^{63}Co Levels

E(level)[†]	J^π[‡]	$T_{1/2}$[‡]
0.0	$7/2^-$	27.4 s *4*
994.92 *15*	$3/2^-$	10.7 ps *12*
1427.14 *16*	$(5/2^-)$	
1494.73 *21*	$(3/2^-)$	
1576.89 *28*	$(3/2,5/2,7/2^-)$	
1888.6 *4*	$1/2^-$	>244 fs
2793.89 *26*	$(5/2^-,7/2^-)$	
3422.0 *10*	$(3/2,5/2,7/2^-)$	

[†] From a least-squares fit to γ-ray energies.
[‡] From Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
(2794 *19*)	3422.0	0.2	6.4	av Eβ=1188.9 *91*
(3422 *19*)	2793.89	1.7	5.8	av Eβ=1490.1 *92*
(4327 *19*)	1888.6	0.3	7.0	av Eβ=1928.2 *92*
(4639 *19*)	1576.89	0.24	7.2	av Eβ=2079.7 *93*
(4721 *19*)	1494.73	0.08	7.8	av Eβ=2119.6 *93*
(4789 *19*)	1427.14	5	6.0	av Eβ=2152.5 *93*
(5221 *19*)	994.92	12	5.8	av Eβ=2362.9 *93*
(6216 *19*)	0.0	80	5.3	av Eβ=2848.1 *93*
				Iβ^-: from comparison of β singles and $\beta\gamma$-coin spectra (1985Ru05). The authors of 1985Ru05 state that the direct g.s. β feeding (%Iβ=80) is taken from their earlier measurement in 1983Ru06 (%Iβ(g.s.)=76 *26*) after correction for the new values of relative γ-ray intensities in 1985Ru05. Note that both 1985Ru05 and 1983Ru06 deduced %Iβ values by assuming their decay scheme is complete, that is, %Iβ(g.s.)+Σ%Iγ(γ to g.s.)=100 for observed and placed γ transitions. However, the proposed decay scheme is incomplete and their deduced Iβ should be considered as approximate, while the large Iβ^- still can imply this decay branch is strong and allowed.

[†] From Iγ intensity balance at each level, unless otherwise noted. Due to the incomplete decay scheme, the quoted values of Iβ and log *ft* should be considered as approximate.
[‡] Absolute intensity per 100 decays.

^{63}Fe β^- decay (6.1 s) 1985Ru05 (continued)

$\gamma(^{63}Co)$

Iγ normalization: From Σ%Iγ(γ to g.s.)=100−%Iβ⁻(g.s.), with %Iβ⁻(g.s.)=80 from 1985Ru05 (see comments for Iβ(g.s.)). Note that 1364.7γ assigned as a g.s. transition by 1983Ru06 has been re-assigned to be from ^{63}Co decay to ^{63}Ni.

E_γ[†]	I_γ[†‡]	E_i(level)	J_i^π	E_f	J_f^π	Comments
149.7 *4*	0.22 *5*	1576.89	(3/2,5/2,7/2⁻)	1427.14	(5/2⁻)	%Iγ=0.03
[x]357.2 *4*	0.5 *1*					%Iγ=0.07
[x]368.6 *3*	1.0 *1*					%Iγ=0.14
[x]417.6 *5*	0.5 *1*					%Iγ=0.07
432.1 *2*	4.4 *2*	1427.14	(5/2⁻)	994.92	3/2⁻	%Iγ=0.62
461.3 *5*	0.7 *2*	1888.6	1/2⁻	1427.14	(5/2⁻)	%Iγ=0.10
499.6 *3*	1.4 *2*	1494.73	(3/2⁻)	994.92	3/2⁻	%Iγ=0.20
582.0 *3*	1.5 *2*	1576.89	(3/2,5/2,7/2⁻)	994.92	3/2⁻	%Iγ=0.21
893.8 *5*	1.3 *3*	1888.6	1/2⁻	994.92	3/2⁻	%Iγ=0.18
994.8 *2*	100 *3*	994.92	3/2⁻	0.0	7/2⁻	%Iγ=14
						E_γ: other: 994.8 *5* with Iγ=100 *5* (1983Ru06).
[x]1100.5 *5*	0.9 *2*					%Iγ=0.13
1299.0 *2*	8.8 *6*	2793.89	(5/2⁻,7/2⁻)	1494.73	(3/2⁻)	%Iγ=1.24
1427.2 *2*	33 *3*	1427.14	(5/2⁻)	0.0	7/2⁻	%Iγ=4.65
						E_γ: other: 1427.5 *5* with Iγ=46 *6* (1983Ru06).
1494.6 *3*	8.0 *5*	1494.73	(3/2⁻)	0.0	7/2⁻	%Iγ=1.13
[x]1543.0 *5*	1.4 *3*					%Iγ=0.20
1799.3 *5*	2.5 *4*	2793.89	(5/2⁻,7/2⁻)	994.92	3/2⁻	%Iγ=0.35
[x]2154 *1*	3.9 *5*					%Iγ=0.55
2427 *1*	1.5 *4*	3422.0	(3/2,5/2,7/2⁻)	994.92	3/2⁻	%Iγ=0.21
2796 *1*	0.8 *3*	2793.89	(5/2⁻,7/2⁻)	0.0	7/2⁻	%Iγ=0.11

[†] From 1985Ru05.
[‡] For absolute intensity per 100 decays, multiply by 0.14.
[x] γ ray not placed in level scheme.

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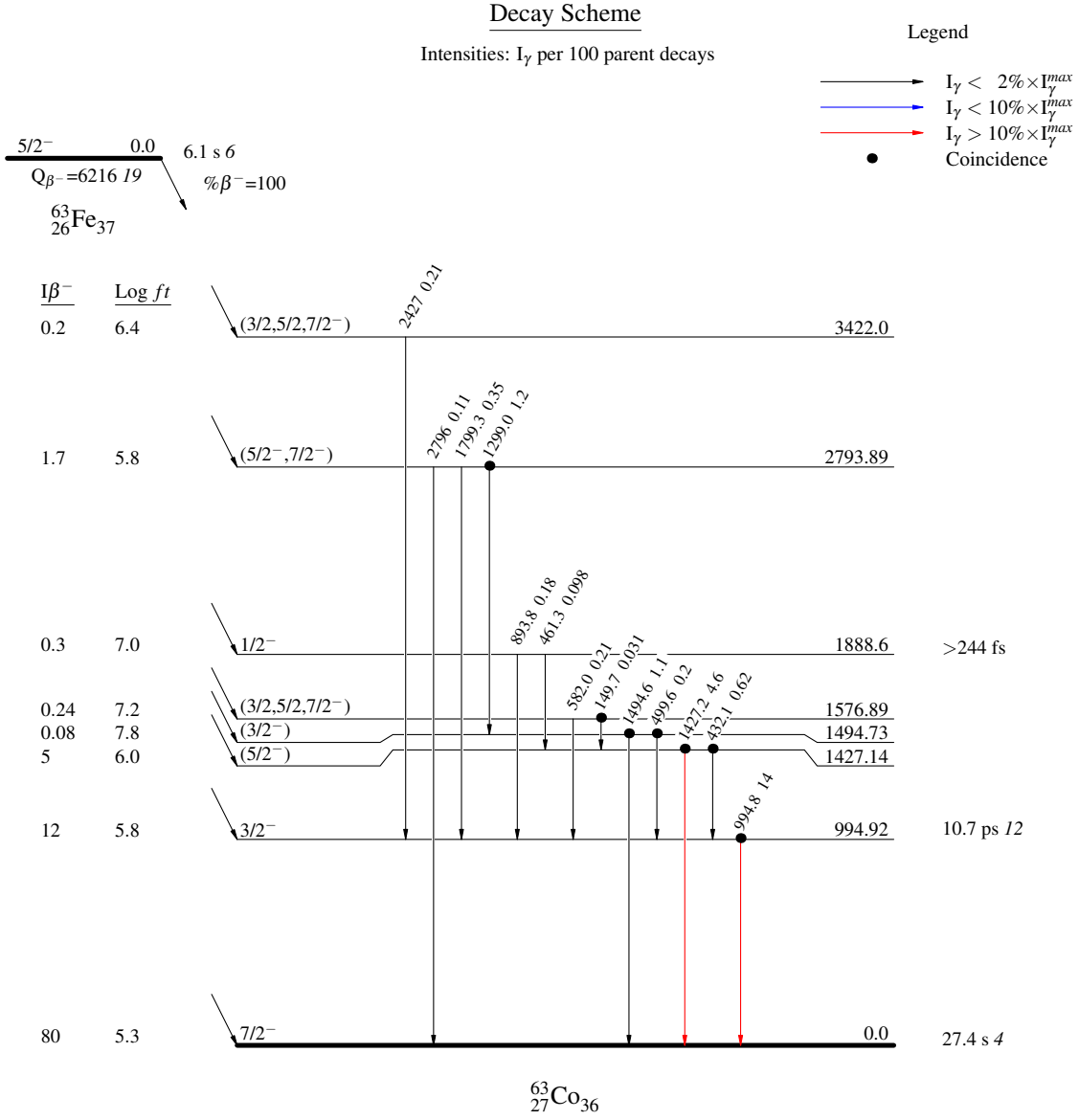
Decay Scheme

Intensities: I_γ per 100 parent decays



$^{63}_{27}Co_{36}$