^{63}Co β^- decay 1985Ru05,1972Jo08,1975Ro25

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

Parent: ^{63}Co: E=0.0; $J^\pi=7/2^-$; $T_{1/2}$=27.4 s *4*; Q(β^-)=3661 *19*; %β^- decay=100

^{63}Co-J^π,$T_{1/2}$: From Adopted Levels of ^{63}Co.

^{63}Co-Q(β^-): From 2021Wa16.

1985Ru05: ^{63}Co source was produced from W(^{82}Se,X) with 11.5 MeV/nucleon ^{82}Se beam from the UNILAC accelerator at GSI. γ rays were detected with Ge detectors and β particles were detected with a 4π plastic scintillator. Measured Eγ, Iγ, $\beta\gamma$-coin, $\gamma\gamma$-coin. Deduced levels, J, π, β-decay branching ratios, log *ft*.

1972Jo08: ^{63}Co source was produced from ^{64}Ni(n,d) with neutrons from irradiation of a beryllium target with 24-28 MeV protons from AVF cyclotron at Amsterdam. γ rays were detected with a Ge(Li) detector. Measured Eγ, Iγ, γ(t). Deduced levels, J, π, parent $T_{1/2}$, β-decay branching ratios, log *ft*.

1975Ro25: ^{63}Co source was produced from ^{64}Ni(n,d) at Amsterdam Measured $\beta\gamma$(t). Deduced $T_{1/2}$ of the 87-keV level,

1969Wa15: ^{63}Co source was produced from ^{64}Ni(n,d) with neutrons from the University of Arkansas 400-KV accelerator. γ rays were were detected with NaI(Tl) and Ge detectors and β particles were detected with a plastic scintillator. Measured Eγ, γ(t). Deduced parent $T_{1/2}$.

2005Pe12 and 2005Pe23: ^{63}Co was produced in reaction of $^{65}Cu^{15+}$ at the IGISOL facility, Jyvaskyla. γ rays were detected with a HPGe detector and β particles were detected with two Si detectors. Measured Eγ, Iγ, β. No numerical data are reported.

The decay scheme is considered incomplete due a large gap of 1.4 MeV between Q-value=3661 *19* and the highest observed level at E=2262.

^{63}Ni Levels

E(level)[†]	J^π[‡]	$T_{1/2}$[‡]	Comments
0.0	$1/2^-$	100.8 y *15*	
87.15 *11*	$5/2^-$	1.69 μs *4*	$T_{1/2}$: value from this dataset: 1.61 μs *7*, from $\beta\gamma$(t) in 1975Ro25.
155.55 *18*	$3/2^-$		
517.8 *6*	$3/2^-$		
1068.99 *23*	$(5/2^-)$		
1251.1 *4*	$(5/2,7/2^-)$		
1451.7 *4*	$(5/2^-,7/2^-,9/2^-)$		
2261.7 *5*	$(5/2^-,7/2^-)$		

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

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
(1399 *19*)	2261.7	1.39	4.9	av Eβ=538.7 *85*
(2209 *19*)	1451.7	1.45	5.7	av Eβ=910.7 *89*
(2410 *19*)	1251.1	1.01	6.0	av Eβ=1005.1 *90*
(2592 *19*)	1068.99	3.76	5.6	av Eβ=1092.1 *90*
(3143[#] *19*)	517.8	0.11	8.9	av Eβ=1364.5 *90*
(3505[#] *19*)	155.55	0.17	9.0	av Eβ=1536.9 *91*
(3574 *19*)	87.15	92	4.8	av Eβ=1561.5 *92*

[†] From γ+ce intensity balance at each level. Due to incomplete decay scheme, Iβ^- and log *ft* should be considered as approximate.
[‡] Absolute intensity per 100 decays.
[#] Existence of this branch is questionable.

^{63}Co β^- decay 1985Ru05,1972Jo08,1975Ro25 (continued)

$\gamma(^{63}Ni)$

Iγ normalization: From ΣI(γ+ce)(to g.s.)=100, assuming the g.s. β^- feeding is zero. It should be considered as approximate due to incomplete decay scheme.

E_γ ‡	I_γ ‡@	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α †	Comments
87.13# *11*	2310 *80*	87.15	5/2$^-$	0.0	1/2$^-$	[E2]	0.969 *14*	α(K)=0.854 *13*; α(L)=0.1002 *15*; α(M)=0.01388 *21* α(N)=0.000458 *7* %Iγ=49.4 E$_\gamma$: other: 86.3 *7* (1969Wa15). I$_\gamma$: other: 1887 (1972Jo08).
155.6# *2*	76 *3*	155.55	3/2$^-$	0.0	1/2$^-$	[M1]	0.01463 *21*	α(K)=0.01312 *19*; α(L)=0.001322 *19*; α(M)=0.0001862 *27* α(N)=7.87×10^{-6} *11* %Iγ=1.63 I$_\gamma$: other: 68 *8* (1972Jo08).
362.3 *5*	5 *1*	517.8	3/2$^-$	155.55	3/2$^-$			%Iγ=0.107
913.6# *5*	25 *3*	1068.99	(5/2$^-$)	155.55	3/2$^-$			%Iγ=0.54 I$_\gamma$: other: 18 *2* (1972Jo08).
981.7# *3*	100 *6*	1068.99	(5/2$^-$)	87.15	5/2$^-$			%Iγ=2.14 I$_\gamma$: other: 100 *11* (1972Jo08).
1069.1# *4*	51 *6*	1068.99	(5/2$^-$)	0.0	1/2$^-$			%Iγ=1.09 I$_\gamma$: other: 62 *12* (1972Jo08).
1095.7 *5*	14 *3*	1251.1	(5/2,7/2$^-$)	155.55	3/2$^-$			%Iγ=0.30
1163.8 *4*	33 *6*	1251.1	(5/2,7/2$^-$)	87.15	5/2$^-$			%Iγ=0.71
1364.5 *3*	68 *6*	1451.7	(5/2$^-$,7/2$^-$,9/2$^-$)	87.15	5/2$^-$			%Iγ=1.45
2106 *1*	25 *5*	2261.7	(5/2$^-$,7/2$^-$)	155.55	3/2$^-$			%Iγ=0.54
2174.5# *5*	40 *6*	2261.7	(5/2$^-$,7/2$^-$)	87.15	5/2$^-$			%Iγ=0.86 I$_\gamma$: other: 47 *5* (1972Jo08).

† Additional information 1.
‡ From 1985Ru05, unless otherwise noted. Intensity values from 1972Jo08 have been normalized to Iγ(981.7γ)=100 by the evaluator, as quoted under comments.
# From 1972Jo08.
@ For absolute intensity per 100 decays, multiply by 0.0214.

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Decay Scheme

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