^{65}Co β^- decay 2009Pa16

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 111, 2425 (2010)	1-Aug-2009

Parent: ^{65}Co: E=0; $J^\pi=(7/2)^-$; $T_{1/2}$=1.16 s *3*; Q(β^-)=5956 *13*; %β^- decay=100.0

^{65}Co-J^π,$T_{1/2}$: from Adopted Levels.

^{65}Co-Q(β^-): from 2009AuZZ.

Additional information 1.

Experiment performed at LISOL facility. Measured Eγ, Iγ, $\gamma\gamma$, $\beta\gamma$ and $\beta\gamma\gamma$ coin using MINIBALL γ-detector array and three thin plastic β detectors. ^{65}Co isotope produced in the reaction ^{238}U(p,F) with a proton energy of 30 MeV, followed by selection of ^{67}Fe fragments using resonant laser ionization together with mass separation.

^{65}Ni Levels

E(level)[†]	J^π	$T_{1/2}$	Comments
0.0	$5/2^-$	2.5175 h *5*	$T_{1/2}$: From Adopted Levels, Gammas.
63.11 *23*	$1/2^-$		
310.37 *10*	$3/2^-$		
1141.11 *20*	$(7/2^-,9/2^-)$		
1273.65 *17*	$(5/2^-)$		

[†] From least-squares fit to γ-ray energies.

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*[†]	Comments
(4682 *13*)	1273.65	4.6 *6*	5.2 *1*	av Eβ=2098 *7* Iβ^-: 5.1 *9* in 2009Pa16.
(4815 *13*)	1141.11	2.9 *4*	5.5 *1*	av Eβ=2162 *7* Iβ^-: 3.2 *4* in 2009Pa16.
(5646[#] *13*)	310.37	≤0.7	≥6.4	av Eβ=2566 *7*
(5893[#] *13*)	63.11	≈0.7	≈6.5	av Eβ=2687 *7*
(5956 *13*)	0.0	91.7 *8*	4.4 *1*	av Eβ=2718 *7*

[†] Additional information 2.
[‡] Absolute intensity per 100 decays.
[#] Existence of this branch is questionable.

$\gamma(^{65}Ni)$

Iγ normalization, I(γ+ce) normalization: From Σ I(γ+ce) to g.s. = 100% − Iβ(g.s.) = 100% − 91.7% 8 = 8.3 % 8 Notice that experimental Iβ(g.s.)=91.7% 8 (2009Pa16).

E$_\gamma$	I$_\gamma$[†‡]	E$_i$(level)	J_i^π	E$_f$	J_f^π	Mult.	α[#]	Comments
63.4 *4*	15 *4*	63.11	$1/2^-$	0.0	$5/2^-$	E2	3.23 *9*	α: Theoretical value calculated using the BrIcc code from www.nndc.bnl.gov. I$_\gamma$: 10 *3* from ^{65}Fe–>^{65}Co-->^{65}Ni decay.
310.4 *1*	82 *11*	310.37	$3/2^-$	0.0	$5/2^-$			I$_\gamma$: 10.9 *14* from ^{65}Fe–>^{65}Co-->^{65}Ni decay.
963.4 *2*	79 *13*	1273.65	$(5/2^-)$	310.37	$3/2^-$			I$_\gamma$: 12 *3* from ^{65}Fe–>^{65}Co-->^{65}Ni decay.

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^{65}Co β^- decay 2009Pa16 (continued)

$\gamma(^{65}Ni)$ (continued)

E_γ	I_γ †‡	E_i(level)	J_i^π	E_f	J_f^π	Comments
1141.1 *2*	100 *10*	1141.11	(7/2$^-$,9/2$^-$)	0.0	5/2$^-$	I_γ: $\Delta I\gamma$=10 assumed by evaluators. I_γ: 12 *2* from ^{65}Fe–>^{65}Co–->^{65}Ni decay.
1210.6 *2*	39 *9*	1273.65	(5/2$^-$)	63.11	1/2$^-$	I_γ: 8 *2* from ^{65}Fe–>^{65}Co–->^{65}Ni decay.
1273.2 *3*	42 *9*	1273.65	(5/2$^-$)	0.0	5/2$^-$	I_γ: 8 *2* from ^{65}Fe–>^{65}Co–->^{65}Ni decay.

† Values given in comments from ^{65}Fe–>^{65}Co–->^{65}Ni decay chain are relative to 100 for 882.5γ in ^{65}Fe decay to ^{65}Co.

‡ For absolute intensity per 100 decays, multiply by 0.029 *4*.

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.

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Decay Scheme

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