^{73}Ni β^- decay (0.84 s) 2001Fr21,1998Fr15

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 158, 1 (2019)	16-May-2019

Parent: ^{73}Ni: E=0.0; J^π=(9/2$^+$); $T_{1/2}$=0.84 s *3*; Q(β^-)=8879 *3*; %β^- decay=100.0

^{73}Ni-J^π,$T_{1/2}$: From ^{73}Ni Adopted Levels.

^{73}Ni-Q(β^-): From 2017Wa10.

2001Fr21, 1998Fr15: Measured Eγ, Iγ, $\gamma\gamma$-coin, $\beta\gamma$ coin. ^{73}Ni obtained from fission of ^{238}U by 30-MeV protons followed by mass separation using LISE-3 separator. See also 2000Mu10 and 1997Wo06 for the production of ^{73}Ni isotope.

1998Am04: Measured half-life of ^{73}Ni isotope.

The decay scheme is considered incomplete due to a large gap between the highest observed level and the Q-value.

^{73}Cu Levels

E(level)[†]	J^π[‡]	Comments
0.0	3/2$^-$	J^π: possible $\pi p_{3/2}\otimes\nu g^4_{9/2}$.
166.07 *10*	(5/2)$^-$	J^π: possible $\pi f_{5/2}$ configuration.
961.21 *20*	(7/2)$^-$	J^π: possible $\pi p_{3/2}\otimes(2^+$ in ^{72}Ni).
1010.14 *15*	(7/2$^-$)	J^π: possible $\pi f^{-1}_{7/2}$.
1297.96 *22*	(7/2$^-$)	J^π: possible $\pi f_{5/2}\otimes(2^+$ in ^{72}Ni).
1489.04 *18*	(9/2$^-$)	J^π: possible member of $\pi f^{-1}_{7/2}$ configuration.
1708.8? *7*		
2161.6 *14*	(7/2$^+$)[#]	
2386.0 *6*	(9/2$^+$,11/2$^+$)[#]	

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

[‡] From Adopted Levels, essentially as proposed by 2001Fr21 for excited states, based on shell-model predictions and comparison with neighboring nuclides.

[#] Possible member of $\pi p_{3/2}\otimes\nu[p^{-1}_{1/2}g^5_{9/2}]_{5-}$ multiplet.

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*[†]	Comments
(6493 *3*)	2386.0	<5	>5.7	av Eβ=2976.1 *15*
(6717 *3*)	2161.6	<4	>5.9	av Eβ=3085.4 *17*
(7390 *3*)	1489.04	<16	>5.5	av Eβ=3413.1 *15*
(7581 *3*)	1297.96	<15	>5.6	av Eβ=3506.2 *15*
(7869 *3*)	1010.14	<24	>5.5	av Eβ=3646.5 *15*
(7918 *3*)	961.21	<19	>5.6	av Eβ=3670.3 *15*
(8713 *3*)	166.07	<20	>5.7	av Eβ=4057.5 *15*

[†] All values are given as limits since the level scheme is not considered as well established.

[‡] Absolute intensity per 100 decays.

$\gamma(^{73}Cu)$

Iγ normalization: Summed γ intensity to g.s.=100, assuming no β^- feeding to g.s. as expected from ΔJ^π involved. It is considered as approximate due to incomplete decay scheme.

Continued on next page (footnotes at end of table)

^{73}Ni β^- decay (0.84 s) 2001Fr21,1998Fr15 (continued)

$\gamma(^{73}Cu)$ (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[‡]	Comments
166.1 *1*	100.0	166.07	$(5/2)^-$	0.0	$3/2^-$	[M1+E2]	0.05 *4*	
478.9 *1*	27.2 *24*	1489.04	$(9/2^-)$	1010.14	$(7/2^-)$			
676.9 *7*	5.0 *11*	2386.0	$(9/2^+,11/2^+)$	1708.8?				
844.2 *2*	29 *3*	1010.14	$(7/2^-)$	166.07	$(5/2)^-$			
961.2 *2*	33 *4*	961.21	$(7/2)^-$	0.0	$3/2^-$			
1010.0 *2*	40 *4*	1010.14	$(7/2^-)$	0.0	$3/2^-$			
1088.2 *6*	3.8 *11*	2386.0	$(9/2^+,11/2^+)$	1297.96	$(7/2^-)$			
1131.9 *2*	29 *3*	1297.96	$(7/2^-)$	166.07	$(5/2)^-$			E_γ: 1131.1 in figure 8 of 2001Fr21.
1542.2 *10*	5.0 *13*	1708.8?		166.07	$(5/2)^-$			
1995.5 *14*	6.8 *18*	2161.6	$(7/2^+)$	166.07	$(5/2)^-$			

[†] For absolute intensity per 100 decays, multiply by ≈0.58.

[‡] 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.

^{73}Ni β^- decay (0.84 s) 2001Fr21,1998Fr15

Decay Scheme

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