^{72}Br ε decay 1974Co14,1974Ha04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	D. Abriola(a), A. A. Sonzogni	NDS 111,1 (2010)	1-May-2009

Parent: ^{72}Br: E=0; $J^\pi=1^+$; $T_{1/2}$=78.6 s *24*; Q(ε)=8799 *7*; %ε+%$β^+$ decay=100.0

The assumption that there is no ground state feeding will lead to a 5% direct feeding of the 1637 keV level with $J^\pi=4^+$, as well as a direct feeding of about 20% to the first 2^+ levels. As a result, the ground state of ^{72}Br could be characterized as having $J^\pi=3^+$. A recent experiment by Piqueras et al (2003Pi03) points to a $J^\pi=1^+$ for the ground state ^{72}Br based on the decay of ^{72}Kr. This result will in turn mean that the ground state feeding of ^{72}Se is not zero. In consequence, all gamma and beta intensities, as well as log *ft* values should be taken as approximate.

The decay scheme is based on γγ coincidence measurements with Ge(Li)-NaI(Tl) (1974Co14).

γγ(t) for 936.8 level (1974Ha04).

^{72}Se Levels

J^π: from Adopted Levels.

E(level)	J^π	$T_{1/2}$	Comments
0.0	0^+		
862.01 *17*	2^+		
937.0 *3*	0^+	15.8 ns *10*	E(level): placed by arguments from γγ data. $T_{1/2}$: from delayed γγ between 1062 and 862 γ's (1974Ha04), with the assumption that $T_{1/2}$ of the 862 level is comparatively short.
1316.78 *20*	2^+		
1636.8 *3*	4^+		
1876.2 *3*	(2,4)		
1998.7 *3*	2^+		
2150.1 *8*	(2^+)		
2371.5 *3*			
2433.2 *4*	3^-		
2586.1 *3*	(3)		
2965.6 *3*			
3123.9 *3*	(4^+)		
3226.1 *3*	$(2,3,4^+)$		
3239.3 *9*			E(level): level suggested by coincidence spectra but argument complex.

ε,$β^+$ radiations

E(decay)	E(level)	I$β^+$ ‡	Iε‡	Log *ft*	I(ε+$β^+$)†‡	Comments
(5560 *7*)	3239.3	<3.2	<0.038	>6.6	<3.2	av Eβ=2090.4 *35*; εK=0.01051 *5*; εL=0.001192 *6*; εM+=0.0002332 *1*
(5573 *7*)	3226.1	4.5 *7*	0.054 *8*	6.45 *7*	4.6 *7*	av Eβ=2096.7 *34*; εK=0.01042 *5*; εL=0.001182 *6*; εM+=0.0002312 *1*
(5675 *7*)	3123.9	11.2 *9*	0.125 *10*	6.10 *4*	11.3 *9*	av Eβ=2146.2 *34*; εK=0.00976 *5*; εL=0.001108 *5*; εM+=0.0002166 *1*
(5833 *7*)	2965.6	4.9 *24*	0.049 *24*	6.53 *22*	4.9 *24*	av Eβ=2222.8 *34*; εK=0.00885 *4*; εL=0.001004 *5*; εM+=0.0001963 *9*
(6213 *7*)	2586.1	2.8 *19*	0.023 *15*	6.9 *3*	2.8 *19*	av Eβ=2407.0 *34*; εK=0.00708 *3*; εL=0.000803 *4*; εM+=0.0001570 *7*
(6366 *7*)	2433.2	5.1 *4*	0.038 *3*	6.73 *4*	5.1 *4*	av Eβ=2481.4 *35*; εK=0.00650 *3*; εL=0.000737 *3*; εM+=0.0001442 *6*
(6428 *7*)	2371.5	12.5 *13*	0.090 *9*	6.36 *5*	12.6 *13*	av Eβ=2511.4 *35*; εK=0.006286 *24*; εL=0.000713 *3*; εM+=0.0001394 *6*
(6649# *7*)	2150.1	<2.9	<0.018	>7.1	<2.9	av Eβ=2619.3 *35*; εK=0.005586 *21*; εL=0.0006335 *2*;

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^{72}Br ε decay 1974Co14,1974Ha04 (continued)

ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log ft	I(ε+β+)†‡	Comments
						εM+=0.0001239 5
(6800 7)	1998.7	6.2 11	0.036 6	6.80 8	6.2 11	av Eβ=2693.1 35; εK=0.005167 19; εL=0.0005859 2; εM+=0.0001146 4
(7162 7)	1636.8	5.1 9	0.025 4	7.01 8	5.1 9	av Eβ=2869.9 35; εK=0.004322 15; εL=0.0004900 1; εM+=9.58×10^{-5} 4
(7482 7)	1316.78	20.0 19	0.085 8	6.51 5	20.1 19	av Eβ=3026.5 35; εK=0.003722 12; εL=0.0004219 1; εM+=8.25×10^{-5} 3
(7937 7)	862.01	22.6 14	0.079 5	6.60 3	22.7 14	av Eβ=3249.5 35; εK=0.003046 9; εL=0.0003453 1; εM+=6.751×10^{-5} 21

† From intensity balance.
‡ Absolute intensity per 100 decays.
# Existence of this branch is questionable.

γ(^{72}Se)

Iγ normalization: from ΣI(γ+ce) (to g.s.)=100, assuming no ε decay to g.s. nor 937, 0+ levels.

Eγ	Iγ‡	Ei(level)	Jiπ	Ef	Jfπ	Mult.	α@	I(γ+ce)#	Comments
75 2		937.0	0+	862.01	2+	[E2]	2.45	9.0† 27	Iγ: peak contamination and unknown detector efficiency prevent determination. Mult.: from adopted Jπ values.
379.9& 3	5.1& 8	1316.78	2+	937.0	0+				
379.9&a 3	<5.1&	2965.6		2586.1	(3)				
454.7 3	18.7 11	1316.78	2+	862.01	2+				
512a 2	2.9 11	2150.1	(2+)	1636.8	4+				Eγ,Iγ: tentative transition, Eγ from E(level) difference and Iγ from γγ only.
537.6 3	1.8 6	3123.9	(4+)	2586.1	(3)				
559.3 3	3.7 4	1876.2	(2,4)	1316.78	2+				
710.2 4	2.3 5	2586.1	(3)	1876.2	(2,4)				
752.8 4	4.2 6	3123.9	(4+)	2371.5					
774.8 3	10.1 6	1636.8	4+	862.01	2+				
832 2	2.9 11	2150.1	(2+)	1316.78	2+				Eγ: obscured by 834γ from ^{72}As.
862.0 2	100	862.01	2+	0.0	0+				
(937)		937.0	0+	0.0	0+	E0		3.3† 17	Mult.: from total conversion; see Adopted Levels.
1014.0 8	1.0 5	1876.2	(2,4)	862.01	2+				
1054.7 3	5.3 9	2371.5		1316.78	2+				
1061.6 3	7.9 7	1998.7	2+	937.0	0+				
1089.2& 3	<4.5&	2965.6		1876.2	(2,4)				Eγ: possible multiplet from coincidence data.
1089.2& 3	<4.5&	3239.3		2150.1	(2+)				Eγ: multiplet nature of 1089γ suggested by coincidence data.
1125.1 3	7.6 8	3123.9	(4+)	1998.7	2+				
1136.4 4	10.0 10	1998.7	2+	862.01	2+				
1227.3 4	1.5 6	3226.1	(2,3,4+)	1998.7	2+				
1269.5 5	1.2 6	2586.1	(3)	1316.78	2+				

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^{72}Br ε decay 1974Co14,1974Ha04 (continued)

γ(^{72}Se) (continued)

E_γ	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	E_γ	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π
1316.7 *3*	24.6 *15*	1316.78	2^+	0.0	0^+	1807.4 *6*	2.5 *5*	3123.9	(4^+)	1316.78	2^+
1349.9 *3*	3.2 *6*	3226.1	$(2,3,4^+)$	1876.2	(2,4)	1909.4 *7*	1.9 *5*	3226.1	$(2,3,4^+)$	1316.78	2^+
1433.6 *10*	1.4 *5*	2371.5		937.0	0^+	2150.7 *10*	1.4 *4*	2150.1	(2^+)	0.0	0^+
1509.8 *4*	4.7 *8*	2371.5		862.01	2^+	2371.9 *7*	10.7 *11*	2371.5		0.0	0^+
1571.3 *4*	5.4 *4*	2433.2	3^-	862.01	2^+	2432.7 *8*	1.8 *4*	2433.2	3^-	0.0	0^+
1648.5 *5*	2.2 *6*	2965.6		1316.78	2^+	[x]2465.0 *8*	1.4 *4*				
1724.0 *5*	4.9 *4*	2586.1	(3)	862.01	2^+						

† From I(γ+ce)(75+937)=ΣIγ(feeding the 937 level) and I(γ+ce)(937γ)/I(γ+ce)(75γ)=0.37 *23*, from a comparison of singles and γγ intensities (1974Ha04). Iγ(379.9γ) feeding the 937 level is taken as 3.0 *30*.

‡ For absolute intensity per 100 decays, multiply by 0.702.

Absolute intensity per 100 decays.

@ 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.

& Multiply placed with undivided intensity.

a Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

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Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given