^{122}I ε decay 1981Ng04,1969Gf01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	T. Tamura	NDS 108, 455 (2007)	30-Sep-2006

Parent: ^{122}I: E=0.0; $J^\pi=1^+$; $T_{1/2}$=3.63 min *6*; Q(ε)=4234 *5*; %ε+%β^+ decay=100.0

The decay scheme is that proposed by 1981Ng04 and 1969Gf01.

1981Ng04: Ce(p,spallation) E(p)=660 MeV, chem, mass, ^{122}Xe ε decay; semi γ, $\gamma\gamma$-coin.

1969Gf01: ^{120}Te(α,2n) ^{122}Xe ε decay, ^{122}Te(d,2n) no chem; semi γ, scin-semi $\gamma\gamma$-coin.

1987Gi09: ^{122}Te(p,n) E(p)=7 MeV, magnetic electron transport with Si(Li), FWHM=4 keV, measured Ice, deduced E0.

1987Wa17: ^{93}Nb(^{32}S,x), ^{93}Nb(^{34}S,x) E=160-175 MeV, measured I(ce), $\gamma\gamma$-coin, γ lin pol; deduced J^π, γ-branching, α.

Others: γ, $\gamma\gamma$-coin (1969Sp07,1968La22,1970Ga32); β^+ (1963Jh04,1954Ma75,1960Mo09,1951Yo06,1950Ma29,1965Bu03, 1977ReZK); $\gamma\gamma(\theta)$ (1963Jh04).

^{122}Te Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0	0^+	1940.555 *23*	0^+	2508.51 *9*	$(2)^+$	3052.07 *13*	0^+,1,2
564.117 *14*	2^+	2099.20 *5*	$(2)^+$	2593.87 *7*	2^+	3149.62 *9*	0^+,1,2
1181.43 *9*	4^+	2287.43 *7*	2^+	2719.29 *7*	1,2^+	3302.59 *13*	0^+,1,2
1256.909 *15*	2^+	2297.4 *4*	(0^+)	2756.42 *4*	0^+,1^+,2^+	3483.48 *10*	1,2^+
1357.42 *3*	0^+	2311.05 *4*	$(2)^+$	2911.01 *14*	1^+,2^+	3590.89 *7*	1^+,2^+
1752.85 *6*	2^+	2407.92 *5*	$(2)^+$	3044.89 *10*	1^+,2^+		

† E(levels) are based on a least-squares fit to the E(γ's) of 1981Ng04 (evaluator).

‡ From Adopted Levels.

ε,β^+ radiations

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*	I(ε+β+)†‡	Comments
(643 *5*)	3590.89		0.052 *15*	5.73 *13*	0.052 *15*	εK=0.8488 *1*; εL=0.11938 *7*; εM+=0.03179 *3*
(751 *5*)	3483.48		0.031 *9*	6.09 *13*	0.031 *9*	εK=0.8505; εL=0.11811 *5*; εM+=0.03140 *2*
(931# *5*)	3302.59		0.012 *4*	6.70 *15*	0.012 *4*	εK=0.8524; εL=0.11666 *4*; εM+=0.03095 *1*
(1084 *5*)	3149.62		0.044 *13*	6.27 *13*	0.044 *13*	εK=0.8535; εL=0.11583 *3*; εM+=0.030694 *8*
(1182 *5*)	3052.07		0.020 *7*	6.69 *16*	0.020 *7*	εK=0.8540; εL=0.11541 *2*; εM+=0.030564 *7*
(1189 *5*)	3044.89		0.032 *10*	6.49 *14*	0.032 *10*	εK=0.8540; εL=0.11538 *2*; εM+=0.030555 *7*
(1323 *5*)	2911.01	2.0×10^{-5} *6*	0.017 *5*	6.86 *13*	0.017 *5*	av Eβ=144.1 *24*; εK=0.8537; εL=0.11479 *3*; εM+=0.030379 *8*
(1478 *5*)	2756.42	0.0027 *8*	0.43 *12*	5.56 *13*	0.43 *12*	av Eβ=211.6 *22*; εK=0.8499 *3*; εL=0.11378 *5*; εM+=0.03009 *2*
(1515 *5*)	2719.29	0.00047 *14*	0.056 *16*	6.47 *13*	0.056 *16*	av Eβ=227.7 *22*; εK=0.8481 *3*; εL=0.11344 *5*; εM+=0.03000 *2*
(1640 *5*)	2593.87	0.0010 *3*	0.052 *16*	6.57 *14*	0.053 *16*	av Eβ=282.3 *22*; εK=0.8388 *5*; εL=0.11189 *8*; εM+=0.02958 *2*
(1725# *5*)	2508.51	0.0013 *4*	0.039 *12*	6.74 *13*	0.040 *12*	av Eβ=319.5 *22*; εK=0.8291 *7*; εL=0.1104 *1*; εM+=0.02918 *3*
(1826# *5*)	2407.92	0.0033 *9*	0.063 *18*	6.58 *13*	0.066 *19*	av Eβ=363.4 *22*; εK=0.8136 *9*; εL=0.10815 *13*; εM+=0.02857 *4*
(1923 *5*)	2311.05	0.027 *8*	0.34 *10*	5.89 *13*	0.37 *11*	av Eβ=405.7 *22*; εK=0.7943 *11*; εL=0.10543 *16*; εM+=0.02785 *5*
(1937 *5*)	2297.4	0.0016 *5*	0.019 *6*	7.14 *15*	0.021 *7*	av Eβ=411.7 *22*; εK=0.7913 *12*; εL=0.10501 *16*; εM+=0.02774 *5*
(1947 *5*)	2287.43	0.0035 *10*	0.041 *12*	6.83 *13*	0.044 *13*	av Eβ=416.1 *22*; εK=0.7890 *12*; εL=0.10469 *17*; εM+=0.02765 *5*

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^{122}I ε decay 1981Ng04,1969Gf01 (continued)

ε,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ ‡	Iε‡	Log *ft*	I(ε+β^+)†‡	Comments
(2135 *5*)	2099.20	0.0078 *22*	0.048 *14*	6.83 *13*	0.056 *16*	av Eβ=499.0 *22*; εK=0.7379 *16*; εL=0.09767 *21*; εM+=0.02579 *6*
(2293 *5*)	1940.555	0.17 *5*	0.67 *19*	5.75 *13*	0.84 *24*	av Eβ=569.3 *23*; εK=0.6849 *18*; εL=0.09049 *24*; εM+=0.02389 *7*
(2481 *5*)	1752.85	0.023 *7*	0.058 *16*	6.88 *13*	0.081 *23*	av Eβ=653.1 *23*; εK=0.6148 *20*; εL=0.0811 *3*; εM+=0.02140 *7*
(2877 *5*)	1357.42	0.60 *18*	0.70 *22*	5.93 *14*	1.3 *4*	av Eβ=831.4 *23*; εK=0.4642 *18*; εL=0.06103 *24*; εM+=0.01610 *7*
(2977 *5*)	1256.909	0.31 *9*	0.32 *9*	6.31 *13*	0.63 *18*	av Eβ=877.0 *23*; εK=0.4288 *18*; εL=0.05635 *23*; εM+=0.01486 *6*
(3670 *5*)	564.117	10 *3*	4.0 *11*	5.39 *13*	14 *4*	av Eβ=1195.3 *24*; εK=0.2421 *10*; εL=0.03170 *14*; εM+=0.00836 *4*
(4234 *5*)	0.0	67 *5*	15 *1*	4.95 *4*	82 *6*	av Eβ=1458.1 *24*; εK=0.1545 *6*; εL=0.02020 *8*; εM+=0.005324 *21* E(decay): E(β^+)=3120 *40* (1954Ma75).

† I(ε+β^+)=81.9 *2*(to g.s.) is calculated using Iγ(564.117γ)/Iγ($\gamma^\pm$)=0.121 and I($\gamma^\pm$)=1.85 I(β^+) (1969Gf01) and theoretical ε/β^+ ratios in the decay scheme.

‡ Absolute intensity per 100 decays.

Existence of this branch is questionable.

γ(^{122}Te)

Iγ normalization: Iγ(564.117γ)/Iγ(γ$^{\pm}$)=0.115 (1969Gf01) and theoretical ε/β^{+} ratios in the decay scheme. The authors quote no uncertainty in Iγ/Iγ(γ$^{\pm}$). The evaluator assumes that this ratio is accurate to 5%. The resulting uncertainty in the normalization factor is then 28%. A 10% uncertainty in the γ-ratio will lead to 50% uncertainty in normalization factor.

E_γ[†]	I_γ[#b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	δ[a]	α[c]	$I_{(\gamma+ce)}$[b]	Comments
564.119 *17*	100	564.117	2$^+$	0.0	0$^+$	E2		0.00591		Mult.: from Adopted Gammas.
583.1 *2*		1940.555	0$^+$	1357.42	0$^+$	E0			0.0070[@] *22*	$I_{(\gamma+ce)}$: average of Ice=0.0100 *15* (1987Gi09) and 0.0040 *11* (1987Wa17).
617.34 *10*	0.139 *10*	1181.43	4$^+$	564.117	2$^+$	E2				
683.647 *19*	4.42 *9*	1940.555	0$^+$	1256.909	2$^+$					Mult.: α(K)exp=0.0035 *5* (1987Wa17).
692.794 *17*	7.53 *14*	1256.909	2$^+$	564.117	2$^+$	M1+E2	−3.7 *+11−7*			
793.278 *25*	7.37 *14*	1357.42	0$^+$	564.117	2$^+$	E2				
945.78 *23*	0.046 *8*	3044.89	1$^+$,2$^+$	2099.20	(2)$^+$					
953.37 *15*	0.086 *8*	2311.05	(2)$^+$	1357.42	0$^+$					
^{x}1004.3 *3*	0.049 *7*									
1129.71 *17*	0.068 *12*	2311.05	(2)$^+$	1181.43	4$^+$					
1183.00 *5*	0.198 *10*	3590.89	1$^+$,2$^+$	2407.92	(2)$^+$					
1188.76 *7*	0.145 *7*	1752.85	2$^+$	564.117	2$^+$	(M1+E2)	+0.04 *3*			
1256.901 *19*	1.56 *4*	1256.909	2$^+$	0.0	0$^+$	E2				
1337.01 *11*	0.091 *9*	2593.87	2$^+$	1256.909	2$^+$					
^{x}1356.94[‡] *14*	0.075 *7*									
1357.4 *1*		1357.42	0$^+$	0.0	0$^+$	E0			0.0022[@] *3*	$I_{(\gamma+ce)}$: weighted average of Ice=0.0024 *3* (1987Gi09) and 0.0015 *5* (1987Wa17).
1376.40 *6*	0.211 *8*	1940.555	0$^+$	564.117	2$^+$					
1499.50 *4*	0.882 *20*	2756.42	0$^+$,1$^+$,2$^+$	1256.909	2$^+$					
1535.08 *5*	0.358 *13*	2099.20	(2)$^+$	564.117	2$^+$	M1+E2	+2.6 *2*			
^{x}1640.17 *22*	0.053 *10*									
1723.29 *7*	0.211 *10*	2287.43	2$^+$	564.117	2$^+$	M1+E2				
1733.64 *11*	0.119 *9*	2297.4	(0$^+$)	564.117	2$^+$					
1746.93 *4*	1.85 *4*	2311.05	(2)$^+$	564.117	2$^+$					
1752.77 *9*	0.303 *14*	1752.85	2$^+$	0.0	0$^+$	E2				
1795.09 *16*	0.057 *10*	3052.07	0$^+$,1,2	1256.909	2$^+$					
1843.83 *5*	0.566 *17*	2407.92	(2)$^+$	564.117	2$^+$	M1+E2	+2 *+4−1*			
^{x}1897.7 *5*	0.035 *15*									
^{x}1936.1 *4*	0.043 *15*									
1940.6 *2*		1940.555	0$^+$	0.0	0$^+$	E0			0.0044[@] *5*	$I_{(\gamma+ce)}$: weighted average of Ice=0.0045 *6* (1987Gi09) and 0.0040 *10* (1987Wa17).
1944.38 *8*	0.222 *10*	2508.51	(2)$^+$	564.117	2$^+$	M1+E2	+1.6 *+6−3*			

From ENSDF

γ(^{122}Te) (continued)

E_γ[†]	I_γ[#b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ[a]	Comments
2029.71 *8*	0.186 *13*	2593.87	2^+	564.117	2^+			
2155.15 *9*	0.165 *9*	2719.29	$1,2^+$	564.117	2^+			
2192.29 *5*	1.48 *4*	2756.42	$0^+,1^+,2^+$	564.117	2^+			
2226.59 *12*	0.084 *6*	3483.48	$1,2^+$	1256.909	2^+			
2232.74 *20*	0.061 *5*	3590.89	$1^+,2^+$	1357.42	0^+			E_γ: Poor fit. Level-energy difference=2233.45.
2287.5 *3*	0.031 *6*	2287.43	2^+	0.0	0^+			
2310.8 *5*	0.028 *8*	2311.05	$(2)^+$	0.0	0^+			
2334.4 *4*	0.031 *6*	3590.89	$1^+,2^+$	1256.909	2^+			
2346.87 *14*	0.096 *8*	2911.01	$1^+,2^+$	564.117	2^+			
2480.74 *15*	0.101 *13*	3044.89	$1^+,2^+$	564.117	2^+	M1(+E2)	−1 +*1*−*13*	
2488.02 *20*	0.055 *15*	3052.07	$0^+,1,2$	564.117	2^+			
2585.47 *8*	0.243 *8*	3149.62	$0^+,1,2$	564.117	2^+			
2593.2 *7*	0.020 *6*	2593.87	2^+	0.0	0^+			
2719.27 *11*	0.148 *5*	2719.29	$1,2^+$	0.0	0^+			
2738.44 *13*	0.065 *4*	3302.59	$0^+,1,2$	564.117	2^+			
2919.25 *18*	0.090 *5*	3483.48	$1,2^+$	564.117	2^+			
[x]2982.64 *18*	0.047 *4*							
3044.81 *16*	0.032 *4*	3044.89	$1^+,2^+$	0.0	0^+			
[x]3208.03 *19*	0.032 *3*							
[x]3288.97 *25*	0.023 *2*							

[†] From 1981Ng04; 1037.7γ, 1940.4γ and 2793.2γ (measured by 1969Gf01) are not observed by 1981Ng04.

[‡] Placed from 1257.4 keV level in the decay scheme of 1981Ng04, but removed from the decay scheme, because the energy differs 0.45 keV from the 1357.4-keV level, which decays to the g.s. by E0 transition with the side E2 transition to the 564.1-keV, 2^+ state.

[#] Relative to I(564.119γ)=100 (1981Ng04).

[@] Calculated by Ice(E0)=Ice(K)(E0)×(1+0.125) for a correction of L- and M-shell contributions.

[&] E0 from 1987Wa17 and 1987Gi09, others from adopted gammas.

[a] From adopted gammas.

[b] For absolute intensity per 100 decays, multiply by 0.18 *5*.

[c] 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.

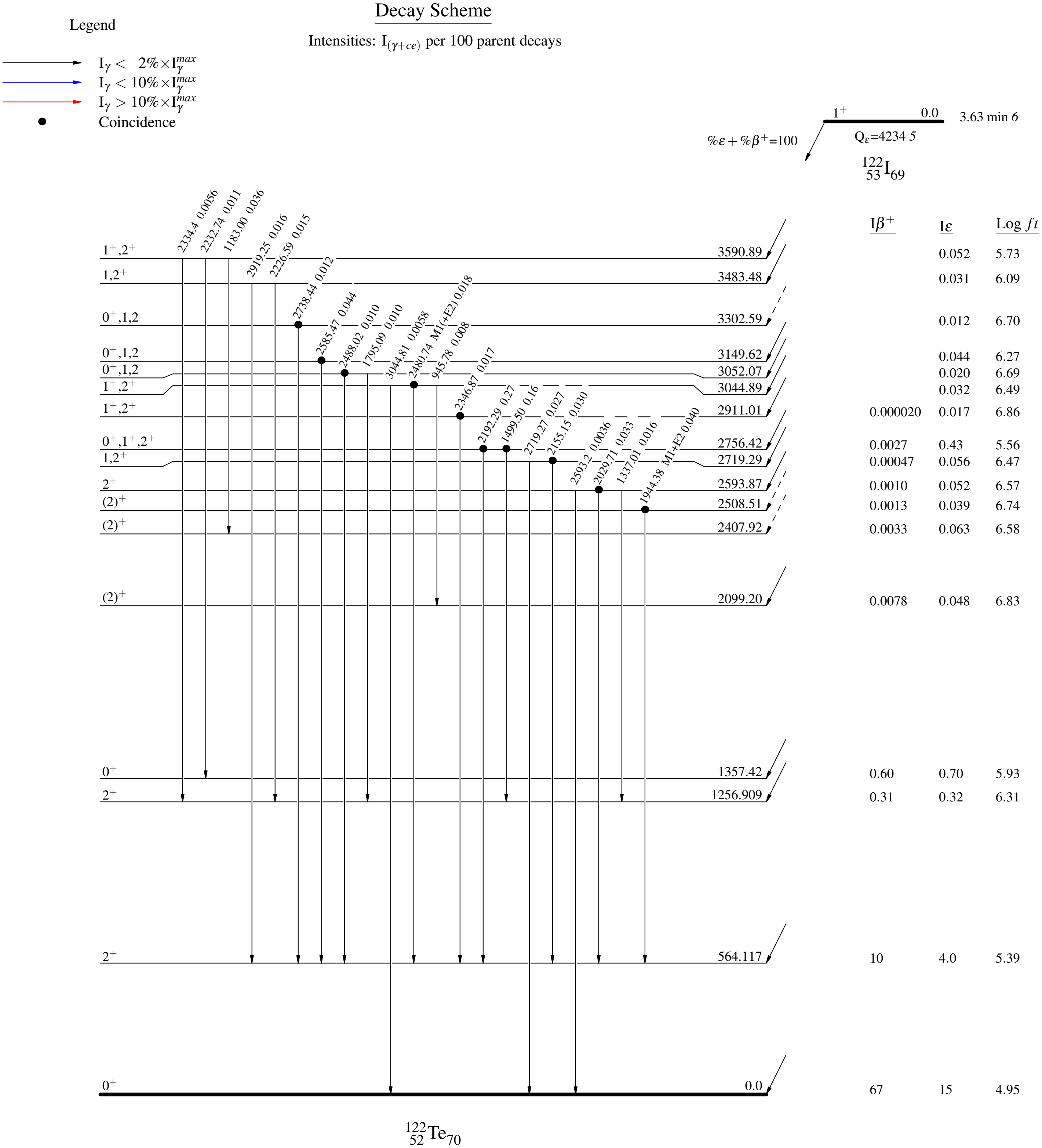
[x] γ ray not placed in level scheme.

$^{122}_{52}$Te$_{70}$-4

^{122}I ε decay 1981Ng04,1969Gf01

Decay Scheme

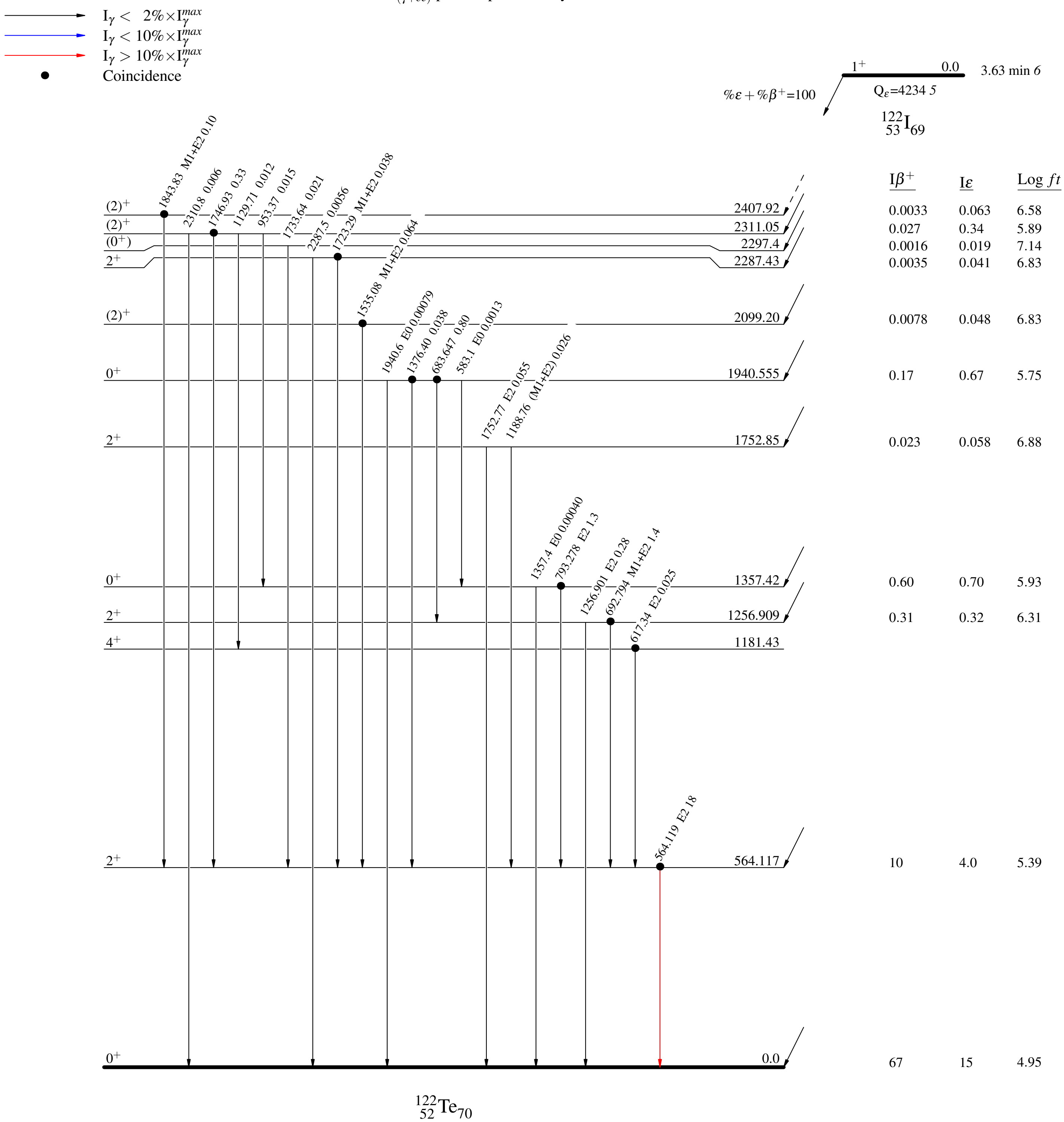
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{122}I ε decay 1981Ng04,1969Gf01

Decay Scheme (continued)

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



Jπ	Level (keV)	Iβ+	Iε	Log ft
(2)+	2407.92	0.0033	0.063	6.58
(2)+	2311.05	0.027	0.34	5.89
(0+)	2297.4	0.0016	0.019	7.14
2+	2287.43	0.0035	0.041	6.83
(2)+	2099.20	0.0078	0.048	6.83
0+	1940.555	0.17	0.67	5.75
2+	1752.85	0.023	0.058	6.88
0+	1357.42	0.60	0.70	5.93
2+	1256.909	0.31	0.32	6.31
4+	1181.43			
2+	564.117	10	4.0	5.39
0+	0.0	67	15	4.95