^{137}Xe β^- decay 1977We02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 108,2173 (2007)	1-Oct-2006

Parent: ^{137}Xe: E=0.0; $J^\pi=7/2^-$; $T_{1/2}$=3.818 min *13*; Q(β^-)=4173 *7*; %β^- decay=100.0

Measured: β, $\beta\gamma$ (1968Ho22,1964On03,1963Ho16), γ, $\gamma\gamma$ (1977We02,1975Fr23,1975Mo06,1968Ho22), ce (1972Ac02).

Decay scheme is that proposed by 1977We02.

^{137}Cs Levels

E(level)	J^π†	$T_{1/2}$	Comments
0.0	$7/2^+$	30.08 y *9*	$T_{1/2}$: From Adopted Levels.
455.490 *3*	$5/2^+$	≤0.1 ns	$T_{1/2}$: from 1975Mo06.
848.90 *6*			
1184.71 *5*	$(11/2^+)$		
1273.20 *6*			
1564.13 *6*			
1569.84 *6*			
1574.84 *6*			
1651.24 *8*			
1783.47 *5*			
1867.87 *7*	$9/2^-$		
1916.27 *10*			
2068.03 *7*	$(3/2^+,5/2^+)$		
2099.41 *9*			
2216.8 *2*			
2367.84 *11*			
2795.9? *2*			
2849.11 *13*			
2850.04 *9*			
2945.19 *17*			
3037.31 *9*			
3104.2 *3*			
3159.5 *2*			
3377.46 *14*			
3584.1 *4*			
3694.1? *4*			
3736.7? *6*			
3786.9 *2*			
3824.0? *2*			
3907.16 *13*			
3938.2? *4*			
3940.8? *10*			
3952.41? *15*			
3955.7? *6*			
3976.4? *8*			

† Adopted values.

^{137}Xe β^- decay 1977We02 (continued)

β^- radiations

β^- feeding is determined by the measurement of 67% 3 b- branch to ground state (1964On03) and γ-ray transition intensity balances.

E(decay)†	E(level)	Iβ⁻‡	Log *ft*	Comments
(197 *7*)	3976.4?	0.0003 *1*	7.05 *16*	av Eβ=53.8 *21*
(217 *7*)	3955.7?	0.0009 *3*	6.71 *16*	av Eβ=60.0 *22*
(221 *7*)	3952.41?	0.030 *4*	5.21 *8*	av Eβ=61.0 *22*
(232 *7*)	3940.8?	0.0002 *1*	7.45 *23*	av Eβ=64.5 *22*
(235 *7*)	3938.2?	0.0011 *5*	6.73 *21*	av Eβ=65.3 *22*
(266 *7*)	3907.16	0.0018 *6*	6.69 *15*	av Eβ=74.9 *22*
(349 *7*)	3824.0?	0.0061 *11*	6.54 *9*	av Eβ=101.5 *23*
(386 *7*)	3786.9	0.011 *2*	6.43 *9*	av Eβ=113.8 *24*
(436 *7*)	3736.7?	0.0010 *4*	7.65 *18*	av Eβ=130.8 *25*
(479 *7*)	3694.1?	0.0062 *10*	6.99 *8*	av Eβ=145.5 *25*
(589 *7*)	3584.1	0.0056 *10*	7.34 *8*	av Eβ=184.9 *26*
(796 *7*)	3377.46	0.027 *4*	7.12 *7*	av Eβ=263.0 *28*
(1014 *7*)	3159.5	0.013 *2*	7.81 *7*	av Eβ=350.0 *29*
(1069 *7*)	3104.2	0.006 *1*	8.24 *8*	av Eβ=372.6 *29*
(1136 *7*)	3037.31	0.036 *5*	7.56 *7*	av Eβ=400.3 *30*
(1228 *7*)	2945.19	0.010 *2*	8.24 *9*	av Eβ=438.9 *30*
(1323 *7*)	2850.04	0.72 *8*	6.50 *5*	av Eβ=479.2 *30*
(1324 *7*)	2849.11	0.100 *15*	7.36 *7*	av Eβ=479.6 *30*
(1377 *7*)	2795.9?	0.004 *1*	8.83 *11*	av Eβ=502.4 *30*
(1805 *7*)	2367.84	<0.003	>9.4	av Eβ=689.7 *32*
(1956 *7*)	2216.8	0.005 *2*	9.32 *18*	av Eβ=757.2 *32*
(2074 *7*)	2099.41	<0.003	>9.6	av Eβ=810.0 *32*
(2105 *7*)	2068.03	0.14 *2*	8.01 *7*	av Eβ=824.1 *32*
(2257 *7*)	1916.27	0.073 *20*	8.41 *12*	av Eβ=892.9 *32*
(2305 *7*)	1867.87	<0.03	>8.8	av Eβ=914.9 *32*
(2390 *7*)	1783.47	0.38 *5*	7.80 *6*	av Eβ=953.4 *32*
(2522 *7*)	1651.24	0.051 *7*	8.76 *6*	av Eβ=1014.0 *33*
(2598 *7*)	1574.84	0.17 *3*	8.29 *8*	av Eβ=1049.0 *33*
(2609 *7*)	1564.13	0.066 *10*	8.71 *7*	av Eβ=1054.0 *33*
(2900 *7*)	1273.20	0.04 *3*	9.1 *4*	av Eβ=1188.1 *33*
(2988 *7*)	1184.71	<0.02	>9.5	av Eβ=1229.1 *33*
(3324 *7*)	848.90	0.65 *8*	8.16 *6*	av Eβ=1385.2 *33*
3.65×10^3 *10*	455.490	31 *3*	6.7	av Eβ=1568.8 *33* Iβ⁻: from analysis of Fermi plot Iβ=35% 6 (1964On03).
4040 *70*	0.0	67 *3*	6.567 *20*	av Eβ=1782.1 *33* Iβ⁻: from analysis of Fermi plot Iβ=55% 14 (1964On03).

† Observed β^-groups have energies: 4150 *100* (1968Ho22), 4040 *70* (67% 3), 3650 *100* (33% 3) (1964On03).
‡ Absolute intensity per 100 decays.

$\gamma(^{137}Cs)$

Iγ normalization: deduced by evaluators from Σ(I(γ+ce) to g.s.)=33% 3 (using Iβ(g.s.)=67% 3 (1964On03)).

E_γ†‡	I_γ#	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α@	Comments
298.00 *7*	3.8 *3*	1867.87	9/2⁻	1569.84				
393.35 *6*	4.5 *3*	848.90		455.490	5/2⁺			
455.490 *3*	1000	455.490	5/2⁺	0.0	7/2⁺	E2	0.012	α(K)=0.0118 *16*; α(L)=0.00163 *7*; α(M)=0.00033 *1*

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^{137}Xe β^- decay 1977We02 (continued)

$\gamma(^{137}Cs)$ (continued)

E_γ [†‡]	I_γ [#]	E_i(level)	J_i^π	E_f	J_f^π	Comments
						E_γ: from 1975Fr23.
						Mult.: α(K)exp=0.0090 *11*, K/L+M+=4.2 *8* (1972Ac02).
482.14 *12*	0.48 *10*	2850.04		2367.84		
594.70 *6*	2.7 *3*	1867.87	$9/2^-$	1273.20		
633.4 *5*	0.08 *4*	2850.04		2216.8		
683.2 *1*	0.65 *7*	1867.87	$9/2^-$	1184.71	$(11/2^+)$	
715.2 *2*	0.21 *5*	1564.13		848.90		
750.65 *10*	0.67 *7*	2850.04		2099.41		
802.4 *4*	0.13 *4*	1651.24		848.90		
848.95 *6*	20 *1*	848.90		0.0	$7/2^+$	
933.82 *6*	2.7 *2*	2850.04		1916.27		
982.25 *5*	6.7 *4*	2850.04		1867.87	$9/2^-$	
[x]1009.9 *2*	0.13 *3*					
1066.6 *2*	1.74 *30*	2850.04		1783.47		
1067.4 *2*	1.57 *30*	1916.27		848.90		
1102.42 *10*	0.53 *5*	3952.41?		2850.04		
1108.63 *6*	1.64 *15*	1564.13		455.490	$5/2^+$	
1114.32 *6*	2.96 *20*	1569.84		455.490	$5/2^+$	
1119.33 *6*	3.43 *20*	1574.84		455.490	$5/2^+$	
1184.70 *6*	2.7 *3*	1184.71	$(11/2^+)$	0.0	$7/2^+$	
1195.75 *6*	1.54 *10*	1651.24		455.490	$5/2^+$	
1219.0 *4*	0.09 *2*	2068.03	$(3/2^+,5/2^+)$	848.90		
1232.1 *7*	0.05 *2*	2795.9?		1564.13		
1236.2 *4*	0.11 *2*	3104.2		1867.87	$9/2^-$	
1250.6 *4*	0.21 *3*	2099.41		848.90		
1273.23 *10*	7.3 *7*	1273.20		0.0	$7/2^+$	
1280.05 *15*	0.30 *3*	2850.04		1569.84		
1327.98 *6*	0.94 *8*	1783.47		455.490	$5/2^+$	
1461.16 *20*	0.55 *7*	1916.27		455.490	$5/2^+$	
1518.8 *5*	0.06 *2*	2367.84		848.90		
1564.0 *2*	0.32 *4*	1564.13		0.0	$7/2^+$	
1569.77 *7*	2.74 *20*	1569.84		0.0	$7/2^+$	
1574.83 *15*	2.3 *3*	1574.84		0.0	$7/2^+$	
1576.75 *10*	3.3 *3*	2850.04		1273.20		
1594.0 *6*	0.10 *2*	3377.46		1783.47		
1612.52 *6*	4.0 *3*	2068.03	$(3/2^+,5/2^+)$	455.490	$5/2^+$	
1644.0 *8*	0.028 *15*	2099.41		455.490	$5/2^+$	
1651.14 *20*	0.14 *2*	1651.24		0.0	$7/2^+$	
1665.30 *7*	1.7 *1*	2850.04		1184.71	$(11/2^+)$	
[x]1677.2 *6*	0.032 *13*					
[x]1713.2 *8*	0.024 *15*					
1720.9 *6*	0.035 *15*	3938.2?		2216.8		
1726.3 *3*	0.077 *13*	3377.46		1651.24		
1761.3 *3*	0.19 *5*	2216.8		455.490	$5/2^+$	
1783.43 *6*	13.3 *6*	1783.47		0.0	$7/2^+$	
[x]1843.0 *4*	0.046 *12*					
1867.96 *8*	0.52 *5*	1867.87	$9/2^-$	0.0	$7/2^+$	
1907.7 *2*	0.17 *2*	3824.0?		1916.27		
1916.31 *8*	3.1 *4*	1916.27		0.0	$7/2^+$	
1933.3 *4*	0.043 *12*	3584.1		1651.24		
1947.0 *2*	0.085 *11*	2795.9?		848.90		
1974.9 *9*	0.038 *12*	3159.5		1184.71	$(11/2^+)$	
2000.3 *2*	0.57 *6*	2849.11		848.90		
2003.4 *3*	0.21 *4*	3786.9		1783.47		
[x]2043.6 *3*	0.057 *12*					
2068.0 *2*	0.33 *3*	2068.03	$(3/2^+,5/2^+)$	0.0	$7/2^+$	

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^{137}Xe β^- decay 1977We02 (continued)

$\gamma(^{137}Cs)$ (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
2084.47 *10*	0.44 *3*	3952.41?		1867.87	$9/2^-$	2849.80 *10*	5.9 *3*	2850.04		0.0	$7/2^+$
2096.4 *3*	0.23 *3*	2945.19		848.90		2921.9 *2*	0.57 *5*	3377.46		455.490	$5/2^+$
2099.42 *15*	0.43 *4*	2099.41		0.0	$7/2^+$	3037.4 *2*	0.14 *2*	3037.31		0.0	$7/2^+$
[x]2119.4 *4*	0.055 *12*					[x]3135.6 *7*	0.012 *5*				
2188.44 *10*	0.26 *3*	3037.31		848.90		3159.4 *2*	0.38 *4*	3159.5		0.0	$7/2^+$
2212.1 *2*	0.13 *2*	3786.9		1574.84		[x]3194.0 *4*	0.029 *6*				
2216.8 *4*	0.076 *30*	2216.8		0.0	$7/2^+$	[x]3250.0 *4*	0.034 *6*				
2255.3 *3*	0.08 *1*	3104.2		848.90		3377.4 *2*	0.064 *8*	3377.46		0.0	$7/2^+$
2287.1 *4*	0.045 *8*	3940.8?		1651.24		3451.8 *8*	0.015 *7*	3907.16		455.490	$5/2^+$
2304.5 *8*	0.018 *8*	3955.7?		1651.24		[x]3458.3 *4*	0.041 *7*				
2311.1 *5*	0.031 *8*	3584.1		1273.20		[x]3476.3 *4*	0.028 *6*				
2367.65 *20*	0.21 *3*	2367.84		0.0	$7/2^+$	3583.7 *3*	0.063 *9*	3584.1		0.0	$7/2^+$
2393.53 *15*	2.6 *2*	2849.11		455.490	$5/2^+$	3694.0 *3*	0.20 *2*	3694.1?		0.0	$7/2^+$
2463.3 *7*	0.023 *9*	3736.7?		1273.20		3736.9 *7*	0.010 *3*	3736.7?		0.0	$7/2^+$
2489.6 *2*	0.088 *10*	2945.19		455.490	$5/2^+$	3907.1 *4*	0.043 *7*	3907.16		0.0	$7/2^+$
2528.6 *6*	0.047 *11*	3377.46		848.90		3940.7 *9*	0.008 *4*	3940.8?		0.0	$7/2^+$
2581.71 *10*	0.75 *7*	3037.31		455.490	$5/2^+$	3955.5 *8*	0.011 *4*	3955.7?		0.0	$7/2^+$
2638.9 *7*	0.029 *11*	3824.0?		1184.71	$(11/2^+)$	3976.4 *8*	0.010 *4*	3976.4?		0.0	$7/2^+$
2735.2 *4*	0.044 *9*	3584.1		848.90							

† From 1975Fr23.

‡ γ's: 526.8, 584.5, 700.0, 865.0, 954.0, 1024.0, 1037.4, 1097.0, 1139.5, 1529.0, 1857.6, 3797.0 from 1975Mo06 were not observed by 1977We02.

For absolute intensity per 100 decays, multiply by 0.031 *3*.

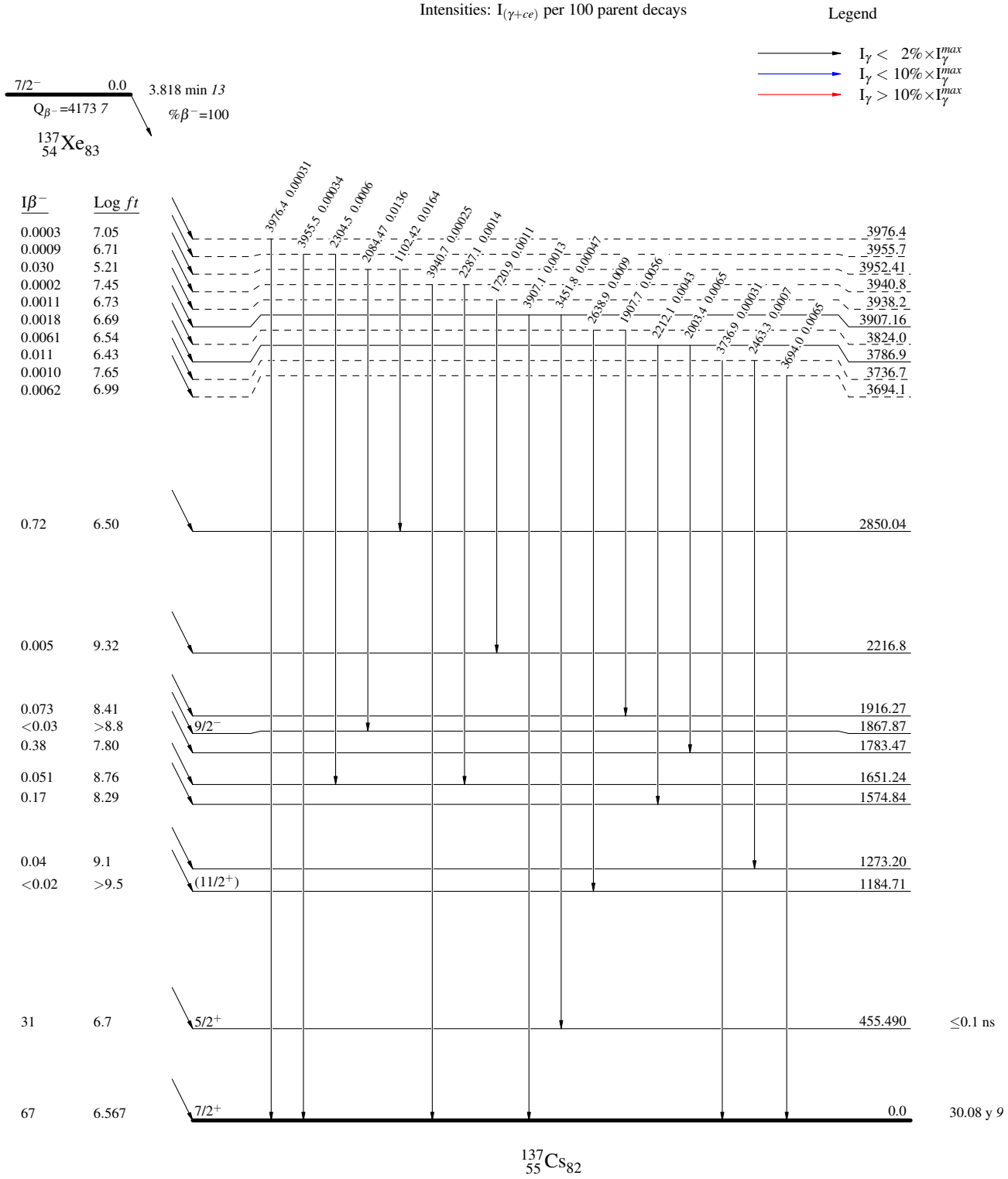
@ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

x γ ray not placed in level scheme.

^{137}Xe β^- decay 1977We02

Decay Scheme

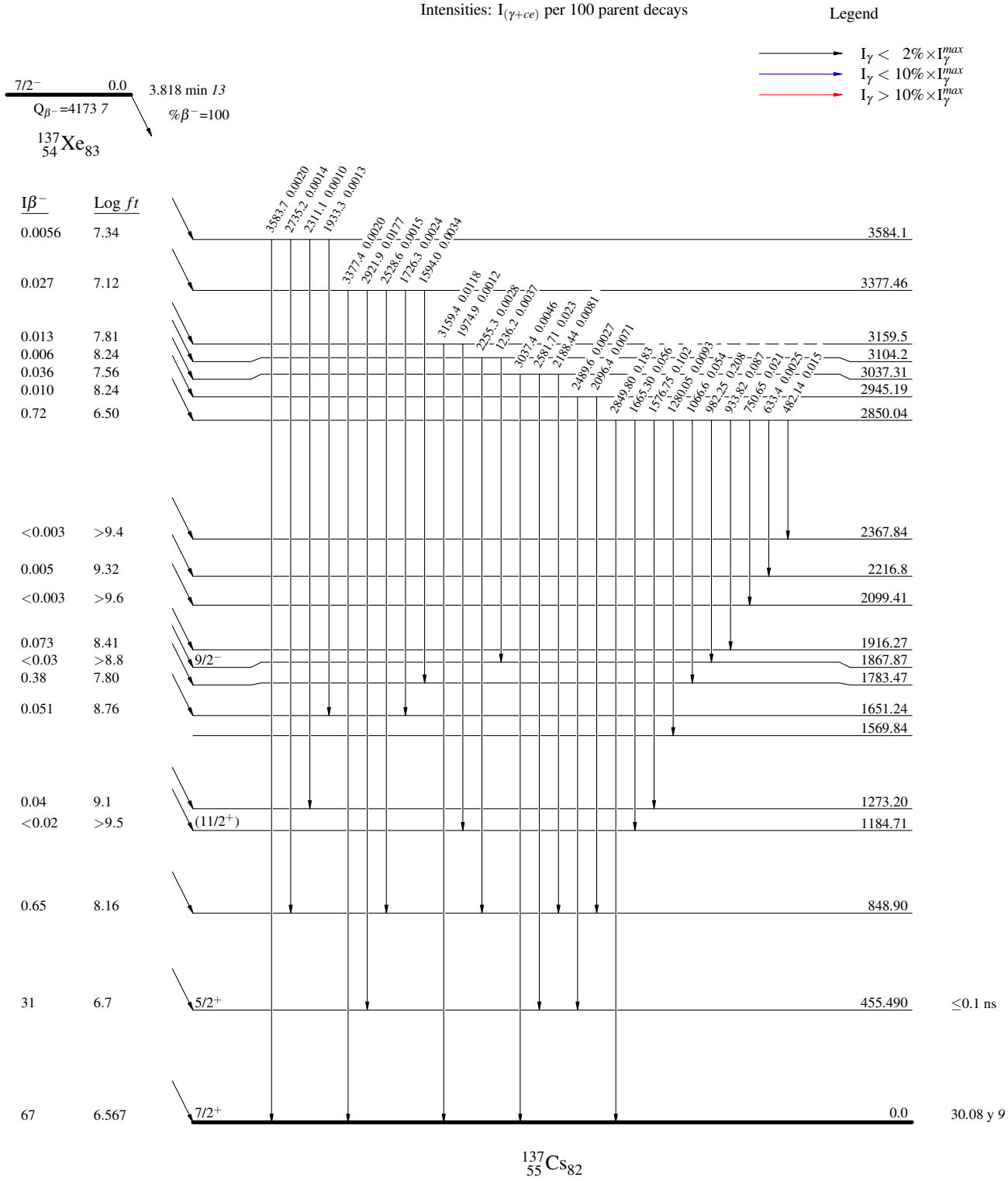
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{137}Xe β^- decay 1977We02

Decay Scheme (continued)

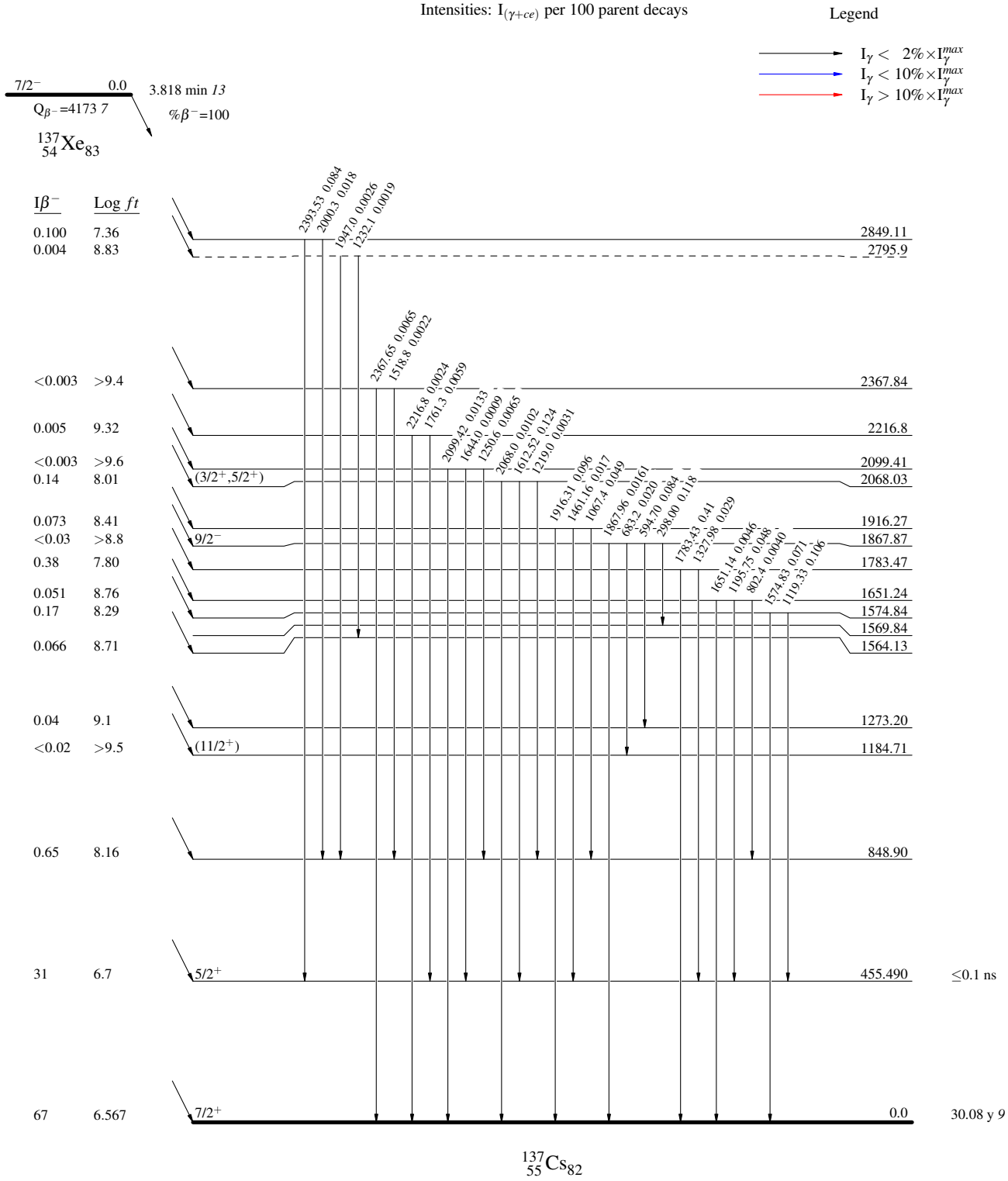
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{137}Xe β^- decay 1977We02

Decay Scheme (continued)

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



^{137}Xe β^- decay 1977We02

Decay Scheme (continued)

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