

Adopted Levels, Gammas

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

$Q(\beta^-)=1175.63$ 18; $S(n)=8278.2$ 19; $S(p)=7405.6$ 4; $Q(\alpha)=-3084$ 5 [2012Wa38](#)

Note: Current evaluation has used the following Q record 1175.63 17 8278.2 19 7409 7 -3084 5 [2003Au03](#).

Theory: [2000Yo08](#), [1998Su03](#), [1993Ch31](#).

Isotope Shifts: [2000Ga58](#), high-resolution resonant laser spectroscopy.

γ -ray source properties: [2000He14](#).

References where ^{137}Cs is used as the standard source, such as, for various calibrations, etc., and not in study of ^{137}Cs structure, have not been included.

 ^{137}Cs LevelsCross Reference (XREF) Flags

A	^{137}Xe β^- decay	E	$^{138}\text{Ba}(d,^3\text{He})$
B	$^{136}\text{Xe}(p,p),(p,p')$ IAR	F	$^{232}\text{Th}(^{136}\text{Xe},X)$
C	$^{136}\text{Xe}(^3\text{He},d)$	G	$^{136}\text{Xe}(^{232}\text{Th},^{231}\text{Ac}\gamma)$
D	$^{138}\text{Ba}(\mu^-,n\gamma)$	H	^{252}Cf SF decay

E(level) [†]	J^π [‡]	$T_{1/2}$	XREF	Comments
0.0@	7/2 ⁺	30.08 y 9	A CDEFGH	$\% \beta^- = 100$ $\mu = +2.8413$ 1 (1989Ra17); $Q = +0.051$ 1 (1989Ra17) $T_{1/2}$: Deduced by evaluators using the Limitation of Relative Statistical Weights (LRSW) method for analyzing the following set of discrepant ($\chi^2/\nu=18.6$) experimental values: 10970 d 20 (2004Sc04); 11018 d 10 (2002Un02); 10941 d 7 (1992Go24); 10968 d 5 (1990Ma15); 11009 d 11 (1980Ho17); 10906 d 33 (1978Gr08); 11034 d 29 (1973Co39); 11021 d 5 (1973Di01); 11023 d 37 (1972Em01); 10921 d 17 (1970Wa19); 11191 d 157 (1970Ha32); 11286 d 256, 10921 d 183 (1965Fl01); 11220 d 47 (1965Le25); 10665 d 110 (1963Ri02); 10840 d 18 (1963Go03); 10994 d 256 (1962Fl09); 11103 d 146 (1961Fa03); 10957 d 146 (1955Br06); and 9715 d 146 (1955Wi21). [1 y = 365.2422 d]. Other evaluated results: 30.09 y 11 (2004Wo02); 30.08 y 3 (1996ChZY , 1994Ka08); 30.11 y 3 (1992Ra08); and 30.18 y 15 (1991BaZS). J^π : from LASER spectroscopy (1978Sc27 , see also 1976Fu06); L=4 in ($^3\text{He},d$) and ($d,^3\text{He}$). μ : 1989Ra17 value based on +2.8413 4 (1957St11). Others: +2.838 7 (1978Sc27), +2.84 1 (1981Th06). Q : 1989Ra17 value from 1975Ac01 . Others: +0.053 4 (1972Ry03), +0.06 2 (1978Sc27), +0.03 4 (1981Th06). J^π : L=2 in ($^3\text{He},d$) and ($d,^3\text{He}$); $\log ft=6.8$, $\log f^{1u}t < 8.5$ from 7/2 ⁻ parent. $T_{1/2}$: from 1975Mo06 in ^{137}Xe β^- decay.
455.491 3	5/2 ⁺	≤ 0.1 ns	A CDE	J^π : L=2 in ($^3\text{He},d$) and ($d,^3\text{He}$); $\log ft=6.8$, $\log f^{1u}t < 8.5$ from 7/2 ⁻ parent.
848.88 4			A D	
1184.69@ 4	(11/2 ⁺)		A FGH	
1273.20 6			A	
1490 12	1/2 ⁺		C	J^π : L=0 in ($^3\text{He},d$).
1564.11 6			A	
1569.83 4			A	
1574.83 6			A	
1651.23 6			A	
1671.69@ 11	(15/2 ⁺)		FGH	
1783.46 5			A	
1867.86 4	9/2 ⁻		A C	J^π : L=5 in ($^3\text{He},d$), γ to 7/2 ⁺ .

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Adopted Levels, Gammas (continued) ^{137}Cs Levels (continued)

E(level) [†]	J ^π [‡]	XREF	Comments
1893.99 & 15	(17/2 ⁺)	FGH	
1916.27 5		A	
2068.02 6	(3/2 ⁺ , 5/2 ⁺)	A C	J ^π : L=2 in (³ He,d).
2099.40 9		A	
2150 17	1/2 ⁺	C	J ^π : L=0 in (³ He,d).
2216.78 22		A	
2367.83 11		A	
2784.19 & 18	(21/2 ⁺)	FGH	
2795.92? 20		A	
2849.10 12		A	
2850.03 4		A	
2876.1 & 17	(19/2 ⁺)	H	
2945.17 17		A	
3037.30 7		A	
3104.15 25		A	
3159.45 20		A	
3168.1 ^c	(19/2 ⁺)	H	
3303.6 ^a	(19/2 ⁻)	H	
3377.46 13		A	
3465.3 ^c 3	(23/2 ⁺)	FGH	
3496.39 ^a 21	(23/2 ⁻)	FGH	
3503.4 ^a	(21/2 ⁻)	H	
3584.10 20		A	
3694.1? 3		A	
3736.7? 5		A	
3786.92 18		A	
3823.96? 20		A	
3907.2 4		A	
3937.7? 7		A	
3938.8? 4		A	
3952.40? 8		A	
3955.7? 6		A	
3976.5? 8		A	
4117.6 ^d	(19/2 ⁺)	H	
4291.0 ^d	(21/2 ⁺)	H	
4351.6 ^d 4	(23/2 ⁺)	FGH	
4408.30 ^a 23	(27/2 ⁻)	FGH	
4776.6 ^d 4	(25/2 ⁺)	FGH	
5023.0 ^b 3	(29/2 ⁻)	FGH	
5494.2 ^b 5	(31/2 ⁻)	FGH	
10195 20	(7/2 ⁻) [#]	B	
10794 20	(3/2 ⁻) [#]	B	
11173 20	(1/2 ⁻) [#]	B	
11421 20	(9/2 ⁻) [#]	B	
11498 20	(5/2 ⁻) [#]	B	
11724 20	(7/2 ⁻)	B	J ^π : from analysis of 1978Fo07. 1969Mo14 report 5/2 ⁻ .
11940 20	(5/2 ⁻) [#]	B	
12050 20	(3/2 ⁻) [#]	B	
12140 20	(1/2 ⁻) [#]	B	
12209 20	(5/2 ⁻) [#]	B	

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Adopted Levels, Gammas (continued) ^{137}Cs Levels (continued)

E(level) [†]	J ^π [‡]	XREF
12399 20	(1/2 ⁻) [#]	B
12479 20	(5/2 ⁻) [#]	B
12698 20	(3/2 ⁻) [#]	B
12788 20	(1/2 ⁻) [#]	B

[†] From least-squares fit to E_γ.[‡] From correspondence with calculated spectrum based on shell model ([1999Br17](#)), unless given otherwise.[#] From analysis of isobaric analog resonances in (p,p).@ Band(A): $\pi g7/2^5$ multiplet.& Band(B): $\pi g7/2^4 d5/2$ multiplet.^a Band(C): $\pi g7/2^4 h11/2$ multiplet.^b Band(D): $\pi g7/2^3 d5/2 h11/2$ multiplet.^c Band(E): $\pi g7/2^3 d5/2^2$ multiplet.^d Band(F): $\pi g7/2^5 \nu f7/2 h11/2$ multiplet. $\gamma(^{137}\text{Cs})$ γ ray data are from either [1977We02](#) or [1999Br17](#), unless noted otherwise.

E _i (level)	J ^π _i	E _γ	I _γ	E _f	J ^π _f	Mult.	α [†]	Comments
455.491	5/2 ⁺	455.490 3	100	0.0	7/2 ⁺	E2	0.0122	B(E2)(W.u.)>6.8 α(K)=0.0103 3; α(L)=0.00156 5; α(M)=0.00032 1
848.88		393.35 6	22.5 15	455.491	5/2 ⁺			
		848.95 6	100 5	0.0	7/2 ⁺			
1184.69	(11/2 ⁺)	1184.67 5	100	0.0	7/2 ⁺			E _γ : weighted average of 1977We02 (1184.70 6) and 1999Br17 (1184.6 1) values.
1273.20		1273.23 10	100	0.0	7/2 ⁺			
1564.11		715.2 2	13 3	848.88				
		1108.63 6	100 9	455.491	5/2 ⁺			
		1564.0 2	19.5 24	0.0	7/2 ⁺			
1569.83		1114.32 6	100 7	455.491	5/2 ⁺			
		1569.77 7	93 7	0.0	7/2 ⁺			
1574.83		1119.33 6	100 6	455.491	5/2 ⁺			
		1574.83 15	67 9	0.0	7/2 ⁺			
1651.23		802.4 4	8 3	848.88				
		1195.75 6	100 6	455.491	5/2 ⁺			
		1651.14 20	9.1 13	0.0	7/2 ⁺			
1671.69	(15/2 ⁺)	487.0 1	100	1184.69	(11/2 ⁺)			
1783.46		1327.98 6	7.1 6	455.491	5/2 ⁺			
		1783.43 6	100 5	0.0	7/2 ⁺			
1867.86	9/2 ⁻	298.00 7	100 8	1569.83				
		594.70 6	71 8	1273.20				
		683.2 1	17.1 18	1184.69	(11/2 ⁺)			
		1867.96 8	13.7 13	0.0	7/2 ⁺			
1893.99	(17/2 ⁺)	222.3 1	100	1671.69	(15/2 ⁺)			
1916.27		1067.4 2	51 10	848.88				
		1461.16 20	17.7 23	455.491	5/2 ⁺			
		1916.31 8	100 13	0.0	7/2 ⁺			

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Adopted Levels, Gammas (continued)

$\gamma(^{137}\text{Cs})$ (continued)					
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π
2068.02	(3/2 ⁺ , 5/2 ⁺)	1219.0 4	2.3 5	848.88	
		1612.52 6	100 8	455.491	5/2 ⁺
		2068.0 2	8.3 8	0.0	7/2 ⁺
2099.40		1250.6 4	49 7	848.88	
		1644.0 8	7 4	455.491	5/2 ⁺
		2099.42 15	100 9	0.0	7/2 ⁺
2216.78		1761.3 3	100 26	455.491	5/2 ⁺
		2216.8 4	40 16	0.0	7/2 ⁺
		1518.8 5	29 10	848.88	
2367.83		2367.65 20	100 14	0.0	7/2 ⁺
2784.19		890.2 1	100	1893.99	(17/2 ⁺)
2795.92?		1232.1 7	59 24	1564.11	
		1947.0 2	100 13	848.88	
2849.10		2000.3 2	21.9 23	848.88	
		2393.53 15	100 8	455.491	5/2 ⁺
2850.03		482.14 12	7.2 15	2367.83	
		633.4 5	1.2 6	2216.78	
		750.65 10	10.0 10	2099.40	
		933.82 6	40 3	1916.27	
		982.25 5	100 6	1867.86	9/2 ⁻
		1066.6 2	26 4	1783.46	
		1280.05 15	4.5 5	1569.83	
		1576.75 10	49 4	1273.20	
		1665.30 7	25.4 15	1184.69	(11/2 ⁺)
		2849.8 1	88 4	0.0	7/2 ⁺
2876.1		982.1	100	1893.99	(17/2 ⁺)
2945.17		2096.4 3	100 13	848.88	
		2489.6 2	38 4	455.491	5/2 ⁺
3037.30		2188.44 10	35 4	848.88	
		2581.71 10	100 9	455.491	5/2 ⁺
		3037.4 2	19 3	0.0	7/2 ⁺
3104.15		1236.2 4	100 18	1867.86	9/2 ⁻
		2255.3 3	73 9	848.88	
		1974.9 9	10 3	1184.69	(11/2 ⁺)
3159.45		3159.4 2	100 11	0.0	7/2 ⁺
3168.1		1274.1	100	1893.99	(17/2 ⁺)
3303.6		1409.6	100	1893.99	(17/2 ⁺)
3377.46		1594.0 6	18 4	1783.46	
		1726.3 3	13.5 23	1651.23	
		2528.6 6	8.2 19	848.88	
		2921.9 2	100 9	455.491	5/2 ⁺
		3377.4 2	11.2 14	0.0	7/2 ⁺
3465.3		681.1 2	100	2784.19	(21/2 ⁺)
3496.39		193.1		3303.6	(19/2 ⁻)
		712.2 1	100	2784.19	(21/2 ⁺)
3503.4		1609.4	100	1893.99	(17/2 ⁺)
3584.10		1933.3 4	68 19	1651.23	
		2311.1 5	49 13	1273.20	
		2735.2 4	70 14	848.88	
		3583.7 3	100 14	0.0	7/2 ⁺
3694.1?		3694.0 3	100	0.0	7/2 ⁺
3736.7?		2463.3 7	100 39	1273.20	
		3736.9 7	44 13	0.0	7/2 ⁺
3786.92		2003.4 3	100 19	1783.46	
		2212.1 2	62 10	1574.83	
3823.96?		1907.7 2	100 12	1916.27	

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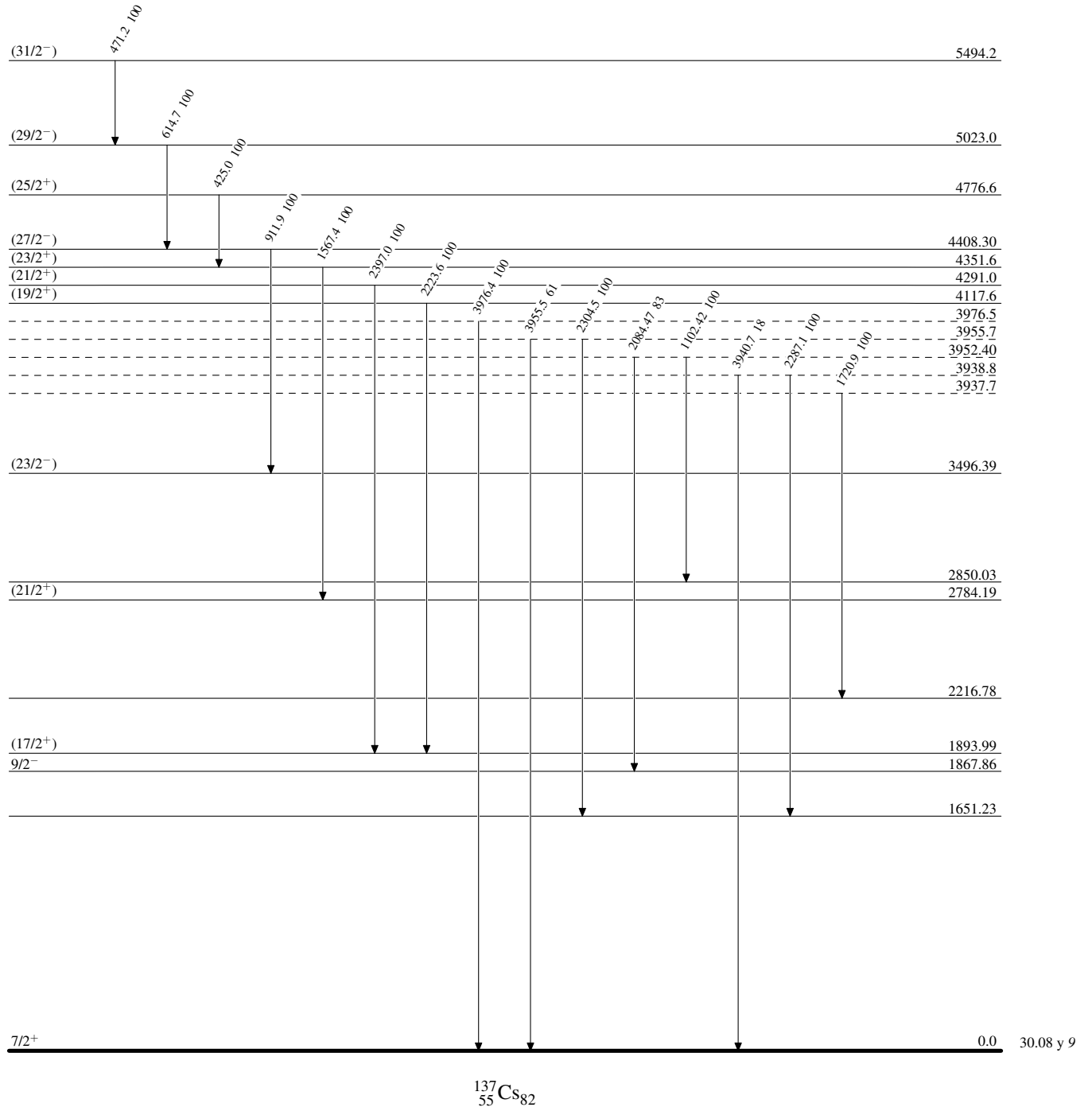
Adopted Levels, Gammas (continued) $\gamma(^{137}\text{Cs})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π
3823.96?		2638.9 7	17 6	1184.69	(11/2 ⁺)
3907.2		3451.8 8	35 16	455.491	5/2 ⁺
		3907.1 4	100 16	0.0	7/2 ⁺
3937.7?		1720.9 6	100	2216.78	
3938.8?		2287.1 4	100 18	1651.23	
		3940.7 9	18 9	0.0	7/2 ⁺
3952.40?		1102.42 10	100 9	2850.03	
		2084.47 10	83 6	1867.86	9/2 ⁻
3955.7?		2304.5 8	100 44	1651.23	
		3955.5 8	61 22	0.0	7/2 ⁺
3976.5?		3976.4 8	100	0.0	7/2 ⁺
4117.6	(19/2 ⁺)	2223.6	100	1893.99	(17/2 ⁺)
4291.0	(21/2 ⁺)	2397.0	100	1893.99	(17/2 ⁺)
4351.6	(23/2 ⁺)	1567.4 3	100	2784.19	(21/2 ⁺)
4408.30	(27/2 ⁻)	911.9 1	100	3496.39	(23/2 ⁻)
4776.6	(25/2 ⁺)	425.0 2	100	4351.6	(23/2 ⁺)
5023.0	(29/2 ⁻)	614.7 2	100	4408.30	(27/2 ⁻)
5494.2	(31/2 ⁻)	471.2 3	100	5023.0	(29/2 ⁻)

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

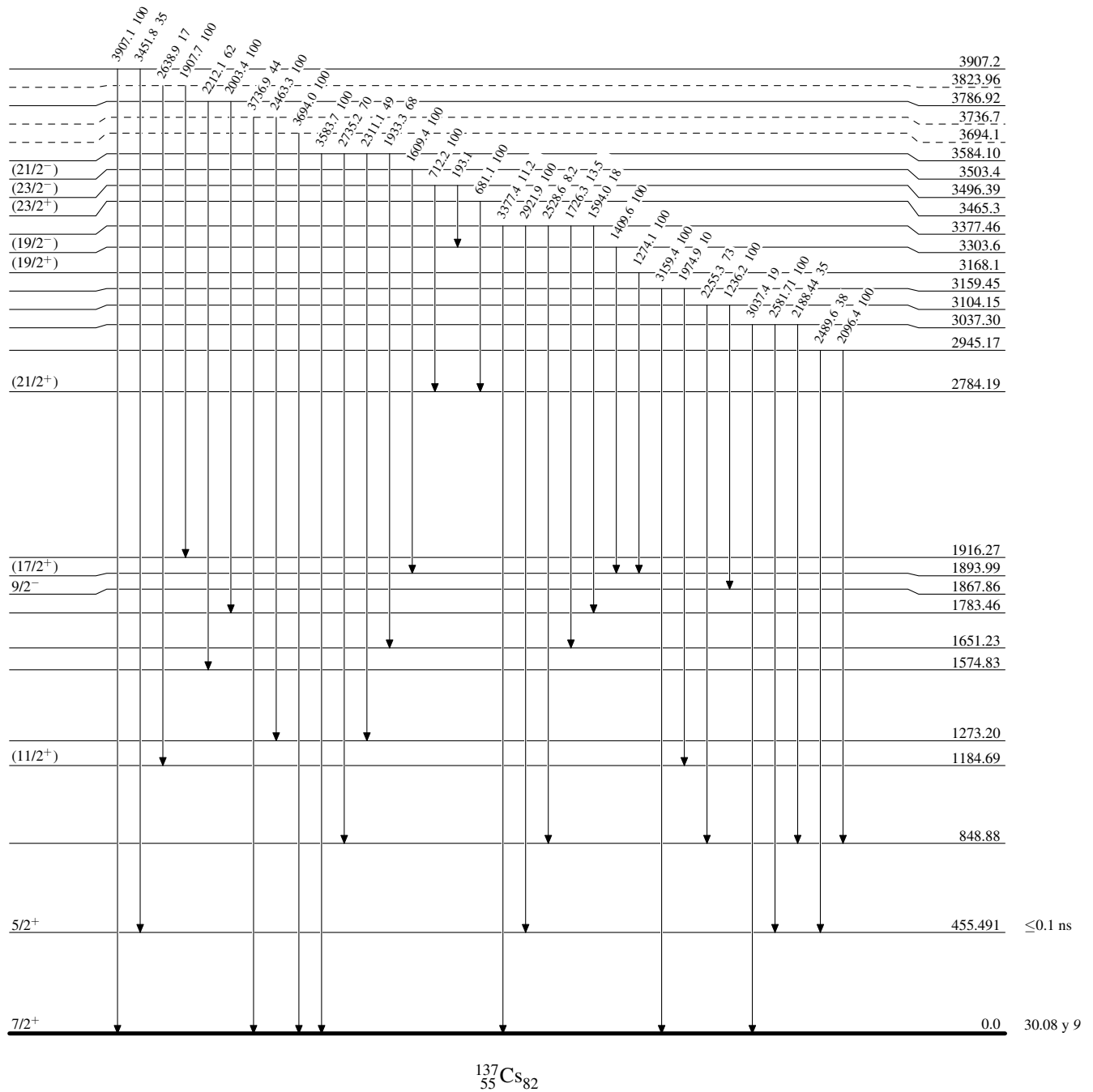
Adopted Levels, Gammas**Level Scheme**

Intensities: Relative photon branching from each level



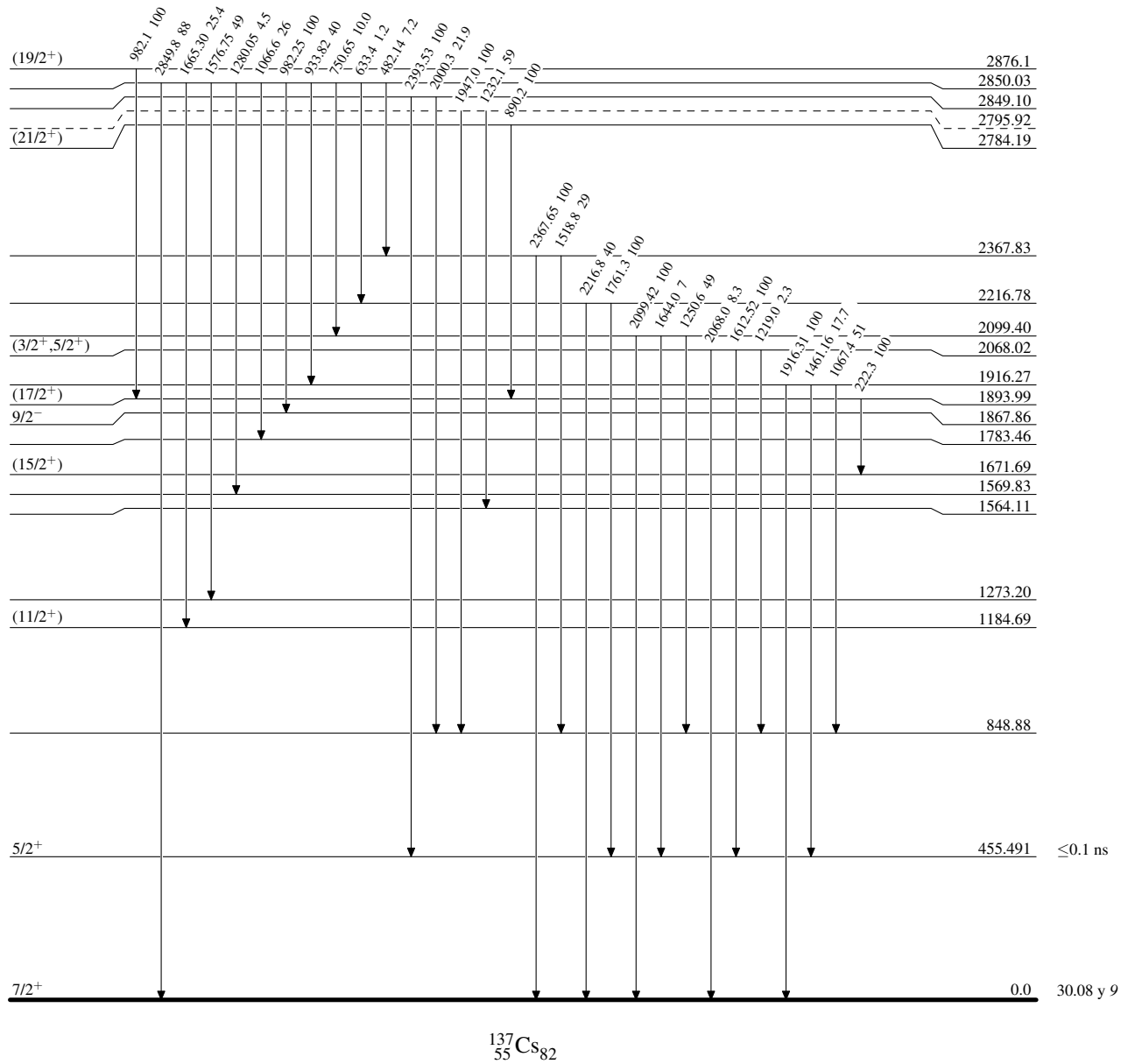
Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level



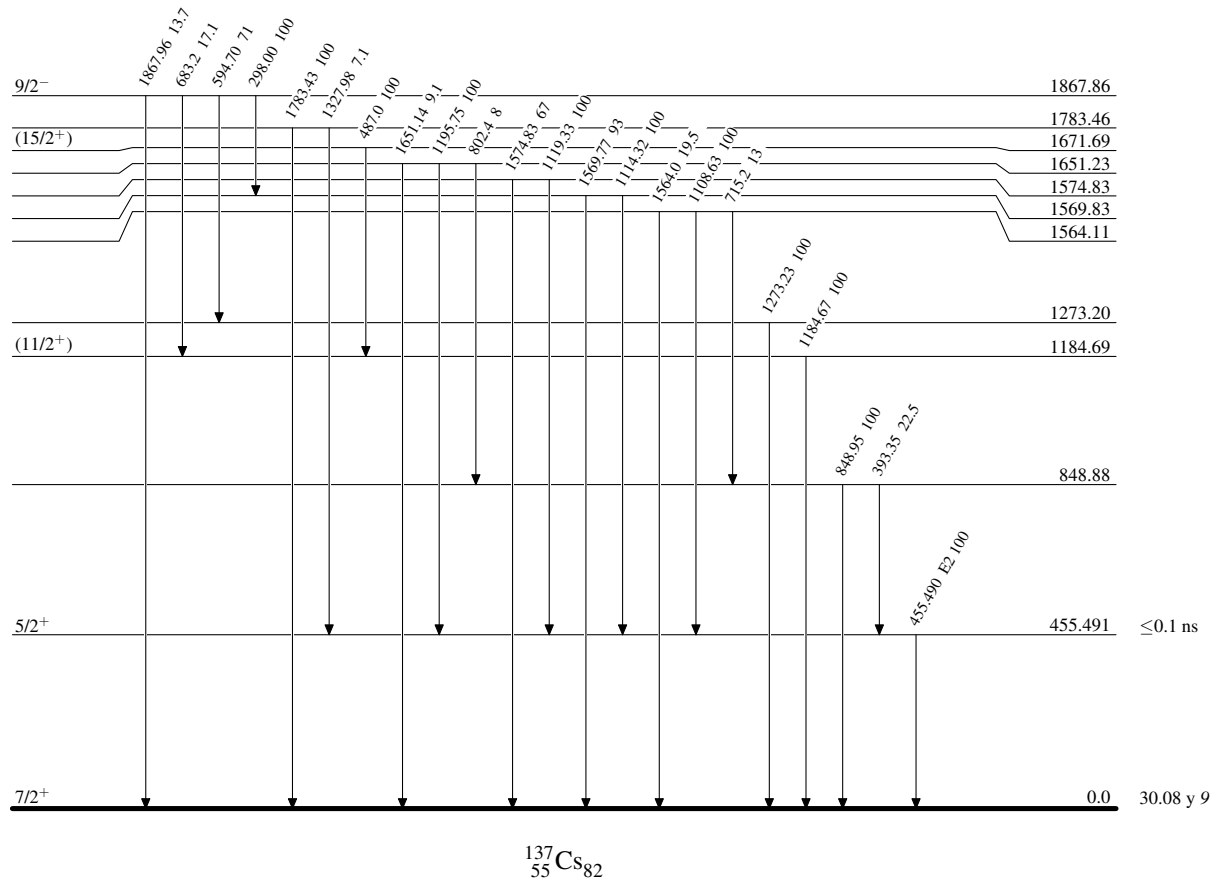
Adopted Levels, Gammas**Level Scheme (continued)**

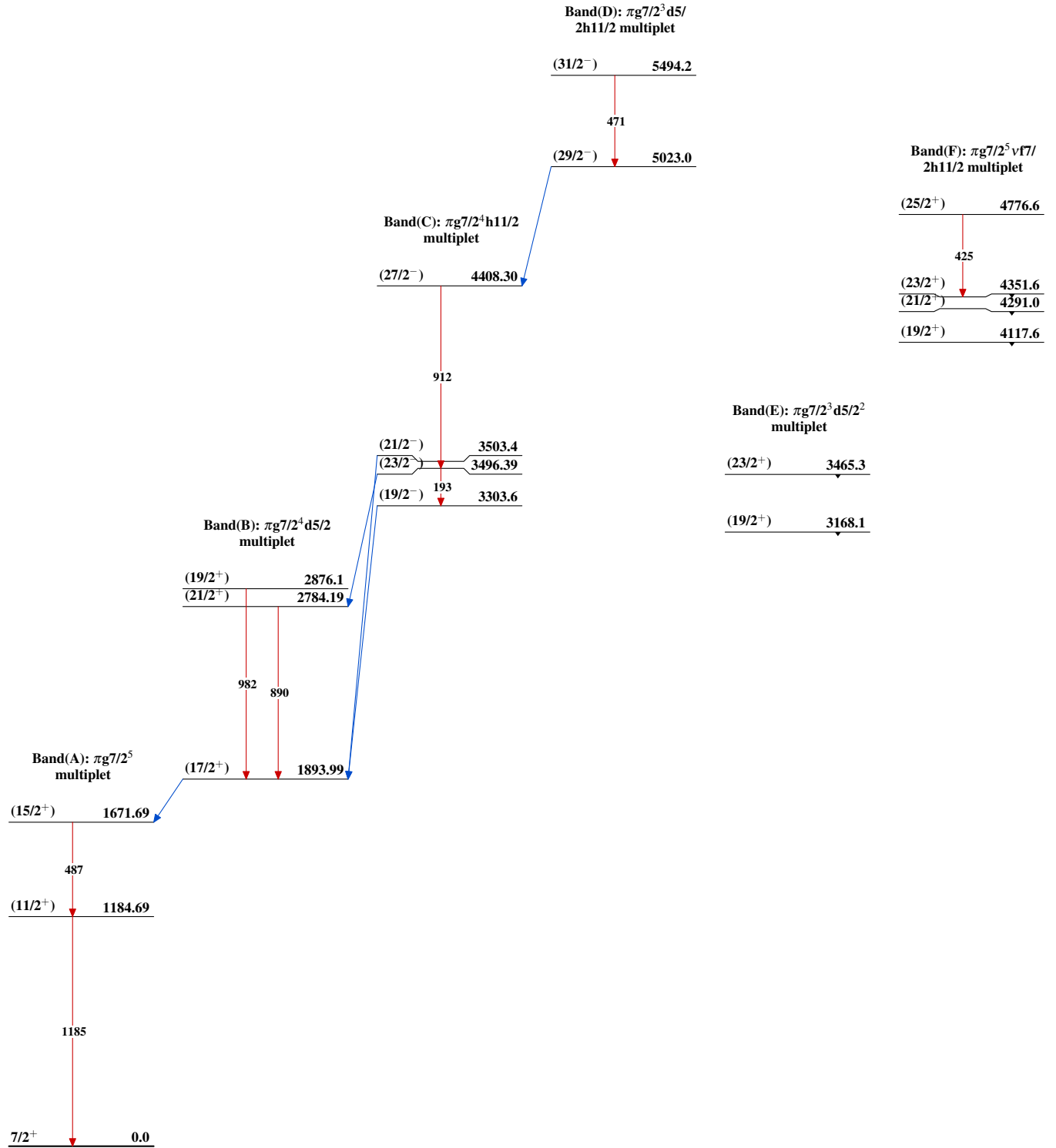
Intensities: Relative photon branching from each level



Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level



Adopted Levels, Gammas $^{137}_{55}\text{Cs}_{82}$