^{136}Pr ε decay 2007Ah02,1973Bu11,1971Ke07

		History	
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 152, 331 (2018)	1-Apr-2018

Parent: ^{136}Pr: E=0.0; J$^{\pi}$=2^{+}; T$_{1/2}$=13.1 min *1*; Q(ε)=5168 *11*; %ε+%β^{+} decay=100.0

1971Ke07: ^{136}Pr activity from ^{136}Ce(p,n) with E(p)=11 MeV followed by chemical separation. Measured Eγ, Iγ, x-rays, $\gamma\gamma$, γ(t) using NaI(Tl) detector for x-rays and Ge(Li) detector for γ rays, and Ece, Ice using Si(Li) detector.

1973Bu11: ^{136}Pr activity from deep fission of gadolinium with a proton beam followed by mass separation. Measured Eγ, Iγ using Ge(Li) detectors and Ece, Ice using magnetic spectrometer coupled to a Si(Li) detector.

2007Ah02: ^{136}Pr activity from ^{134}Ba(^{6}Li,4n) reaction with E(^{6}Li)=47 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$ using the Stony Brook Cube array consisting of six coaxial HPGe detectors.

Other: 1968Zh04, measured γ, β^{+}, ce (spect).

With the exception of the 3233 level (from 1971Ke07), the decay scheme is as proposed by 1973Bu11. All levels proposed by 1973Bu11 were also suggested by 1971Ke07 except for the 1076, 2828, 2942, 2992, 3011, 3201, and 4200 levels. The scheme was constructed on the basis of energy and intensity imbalance and $\gamma\gamma$ coincidences.

A total energy release of 5160 keV *90* as calculated by the code RADLST, is in good agreement with the total available energy of the decay of 5168 keV *11*. Nevertheless, there exist a large number of unplaced transitions and some discrepancies between the two detailed measurements which suggest that the decay scheme is incomplete.

^{136}Ce Levels

E(level)[†]	J$^{\pi}$[‡]	Comments
0.0	0^{+}	
552.05 *13*	2^{+}	
1075.9? *4*		
1091.86 *15*	2^{+}	
1313.53 *24*	4^{+}	
1552.96 *23*	3^{+}	J$^{\pi}$: J=3 from $\gamma\gamma(\theta)$ in 2007Ah02.
2066.71 *22*	2^{+}	J$^{\pi}$: 2 from $\gamma\gamma(\theta)$ in 2007Ah02; non zero value of δ for 1515γ suggests positive parity.
2154.97 *18*	2^{+}	J$^{\pi}$: 2 from $\gamma\gamma(\theta)$ in 2007Ah02; non zero value of δ for 1603γ suggests positive parity.
2451.07 *23*	(2^{+})	
2517.1 *3*	(2^{+},3)	
2595.2 *3*	(2^{+})	
2681.9 *3*	(2^{+})	
2792.7 *4*	(1,2^{+})	
2827.7 *3*	(1,2,3)	
2865.9 *3*	(1,2^{+})	
2904.1 *4*	(1,2,3)	
2931.8 *4*	(1,2^{+})	
2941.9? *5*	(2^{+})	
2991.2? *5*	(2^{+},3,4^{+})	
3011.12? *23*		
3174.5 *4*	(1,2^{+})	
3201.3? *4*	(2^{+})	
3233.0 *3*	(1,2,3)	
3264.1 *4*	(1,2^{+})	
3280.6 *4*	(1,2^{+})	
3361.6 *3*	(1,2^{+})	
3579.4 *7*	(1,2^{+})	
3705.3 *6*	(1,2,3)	
4023.3? *3*	(1,2,3)	

[†] From a least-squares fit to Eγ, by evaluator.

[‡] From the Adopted Levels. Instances where J was determined from measurements in ε decay are indicated in the comments.

^{136}Pr ε decay 2007Ah02,1973Bu11,1971Ke07 (continued)

ε,β^+ radiations

ε/β^+=0.65 *1* from K x ray/$\gamma^\pm$ (1971Ke07).
βγ-coincidences from 1971Ke07.

E(decay)	E(level)	Iβ$^+$ [‡]	Iε[‡]	Log *ft*	I(ε+β$^+$)[‡]	Comments
(1145[#] *11*)	4023.3?		0.58 *4*	5.97 *4*	0.58 *4*	εK=0.8439; εL=0.12166 *7*; εM+=0.03447 *2*
(1463 *11*)	3705.3	0.00047 *6*	0.156 *12*	6.76 *4*	0.156 *12*	av Eβ=208.6 *49*; εK=0.8431 *3*; εL=0.11993 *8*; εM+=0.03391 *3*
(1589 *11*)	3579.4	0.00081 *25*	0.10 *3*	7.03 *13*	0.10 *3*	av Eβ=263.8 *49*; εK=0.8393 *5*; εL=0.1189 *1*; εM+=0.03361 *3*
(1806 *11*)	3361.6	0.016 *2*	0.57 *5*	6.38 *4*	0.59 *5*	av Eβ=359.0 *49*; εK=0.8243 *11*; εL=0.11620 *19*; εM+=0.03281 *6*
(1887 *11*)	3280.6	0.018 *1*	0.46 *3*	6.51 *3*	0.48 *3*	av Eβ=394.5 *49*; εK=0.8153 *14*; εL=0.11475 *22*; εM+=0.03239 *7*
(1904 *11*)	3264.1	0.036 *4*	0.87 *8*	6.24 *4*	0.91 *8*	av Eβ=401.8 *49*; εK=0.8133 *15*; εL=0.11442 *23*; εM+=0.03230 *7*
(1935 *11*)	3233.0	0.027 *3*	0.57 *6*	6.44 *5*	0.60 *6*	av Eβ=415.4 *49*; εK=0.8091 *16*; εL=0.11377 *24*; εM+=0.03211 *7*
(1967[#] *11*)	3201.3?	0.019 *2*	0.36 *3*	6.65 *4*	0.38 *3*	av Eβ=429.3 *49*; εK=0.8046 *17*; εL=0.1131 *3*; εM+=0.03191 *8*
(1994 *11*)	3174.5	0.021 *2*	0.36 *3*	6.67 *4*	0.38 *3*	av Eβ=441.1 *49*; εK=0.8006 *18*; εL=0.1124 *3*; εM+=0.03173 *8*
(2157[#] *11*)	3011.12?	0.015 *4*	0.15 *4*	7.13 *11*	0.16 *4*	av Eβ=513.0 *49*; εK=0.7709 *23*; εL=0.1080 *4*; εM+=0.03046 *10*
(2177[#] *11*)	2991.2?	0.016 *3*	0.15 *3*	7.11 *8*	0.17 *3*	av Eβ=521.8 *49*; εK=0.7667 *24*; εL=0.1074 *4*; εM+=0.03029 *10*
(2226[#] *11*)	2941.9?	0.0289 *25*	0.237 *20*	6.95 *4*	0.266 *22*	av Eβ=543.6 *49*; εK=0.756 *3*; εL=0.1058 *4*; εM+=0.02984 *11*
(2236 *11*)	2931.8	0.041 *5*	0.33 *4*	6.81 *5*	0.37 *4*	av Eβ=548.1 *49*; εK=0.754 *3*; εL=0.1054 *4*; εM+=0.02974 *11*
(2264 *11*)	2904.1	0.042 *8*	0.31 *6*	6.85 *9*	0.35 *7*	av Eβ=560.4 *49*; εK=0.747 *3*; εL=0.1045 *4*; εM+=0.02947 *11*
(2302 *11*)	2865.9	0.139 *12*	0.93 *8*	6.38 *4*	1.07 *9*	av Eβ=577.4 *49*; εK=0.738 *3*; εL=0.1032 *4*; εM+=0.02909 *12*
(2340[†] *11*)	2827.7	0.13 *1*	0.77 *6*	6.48 *4*	0.90 *7*	av Eβ=594.3 *49*; εK=0.728 *3*; εL=0.1018 *5*; εM+=0.02870 *12*
(2375[†] *11*)	2792.7	0.12 *1*	0.67 *5*	6.55 *4*	0.79 *6*	av Eβ=609.9 *49*; εK=0.719 *3*; εL=0.1004 *5*; εM+=0.02832 *12*
(2486[†] *11*)	2681.9	0.11 *2*	0.48 *7*	6.74 *7*	0.59 *9*	av Eβ=659.2 *50*; εK=0.688 *4*; εL=0.0960 *5*; εM+=0.02707 *13*
(2573 *11*)	2595.2	0.311 *16*	1.11 *6*	6.404 *23*	1.42 *7*	av Eβ=698.0 *50*; εK=0.663 *4*; εL=0.0924 *5*; εM+=0.02604 *14*
(2651 *11*)	2517.1	0.32 *3*	0.99 *9*	6.48 *4*	1.31 *12*	av Eβ=733.0 *50*; εK=0.639 *4*; εL=0.0890 *5*; εM+=0.02508 *14*
(2717 *11*)	2451.07	0.71 *8*	1.9 *2*	6.22 *5*	2.6 *3*	av Eβ=762.6 *50*; εK=0.618 *4*; εL=0.0861 *5*; εM+=0.02426 *14*
(3013 *11*)	2154.97	1.6 *1*	2.6 *2*	6.17 *4*	4.2 *3*	av Eβ=896.3 *50*; εK=0.524 *4*; εL=0.0728 *5*; εM+=0.02051 *14*
(3101 *11*)	2066.71	2.2 *1*	3.2 *2*	6.11 *3*	5.4 *3*	av Eβ=936.3 *50*; εK=0.497 *4*; εL=0.0690 *5*; εM+=0.01942 *14*
(3615 *11*)	1552.96	7.2 *4*	5.2 *3*	6.034 *22*	12.4 *6*	av Eβ=1171.2 *51*; εK=0.355 *3*; εL=0.0490 *4*; εM+=0.01381 *11* E(decay): other: 3580 *150* (1971Ke07).
(4076 *11*)	1091.86	40.6 *13*	17.7 *6*	5.604 *15*	58.3 *18*	av Eβ=1384.3 *51*; εK=0.2586 *20*; εL=0.0357 *3*; εM+=0.01004 *8*

Continued on next page (footnotes at end of table)

^{136}Pr ε decay 2007Ah02,1973Bu11,1971Ke07 (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ [‡]	Iε[‡]	Log *ft*	I($\varepsilon+\beta^+$)[‡]	Comments
						E(decay): other: 4044 *20* from G.D. Alkhazov, *et al*. (priv.comm. to 1985Wa04). Others: Eβ+: 3000 *75* (1971Ke07), 2970 *50* (1968Zh04).
(4616 *11*)	552.05	4.2 *24*	1.1 *6*	6.91 *25*	5.3 *30*	av Eβ=1636.0 *52*; εK=0.1804 *13*; εL=0.02485 *18*; εM+=0.00699 *5*

[†] Eβ=1330 *50* originally assigned to ^{136}Pm ε decay by 1968Zh04 may correspond to these transitions.

[‡] Absolute intensity per 100 decays.

[#] Existence of this branch is questionable.

γ(^{136}Ce)

Iγ normalization: from ΣI(γ+c.e.)(to g.s.)=100.
α(K)exp of 1973Bu11 normalized to α(K)(552.2γ)=0.00694 (E2 theory). Others: α(K)exp(540γ,1092γ)=0.0079 *10*, 0.0014 *3*.

E_γ[†b]	I_γ[†c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[d]	Comments
[x]221.87[#e] *26*	0.26 *3*								%Iγ=0.135 *17*
[x]276.5[#e] *5*	0.40 *5*								%Iγ=0.21 *3*
460.9 *3*	14.6 *7*	1552.96	3^+	1091.86	2^+	E2(+M1)	−4.3 *6*	0.01379 *22*	%Iγ=7.6 *5* α(K)exp=1.13×10^{-2} *17* (1973Bu11) α(K)=0.01148 *19*; α(L)=0.00182 *3*; α(M)=0.000387 *6*; α(N)=8.50×10^{-5} *13*; α(O)=1.329×10^{-5} *20* α(P)=8.06×10^{-7} *14* δ: other: second solution of −0.50 *4* from 2007Ah02 is in disagreement with α(K)exp. Mult.,δ: A_2=−0.39 *3*, A_4=−0.03 *4* (2007Ah02).
523.9[@e] *5*	0.65 *4*	1075.9?		552.05	2^+				%Iγ=0.338 *24*
539.75 *19*	100	1091.86	2^+	552.05	2^+	E2(+M1)	−4.7 *7*	0.00895 *14*	%Iγ=52.1 *17* α(K)exp=0.0077 *5* (1973Bu11) α(K)=0.00751 *12*; α(L)=0.001140 *17*; α(M)=0.000241 *4*; α(N)=5.30×10^{-5} *8*; α(O)=8.35×10^{-6} *13* α(P)=5.33×10^{-7} *9* Mult.,δ: A_2=+0.08 *4*, A_4=+0.29 *4* (2007Ah02). α(K)exp: other: 0.0065 *13* (1971Ke07).
552.16 *19*	145 *6*	552.05	2^+	0.0	0^+	E2		0.00827	%Iγ=75.5 *11* α(K)exp=0.0068 *16* (1971Ke07) α(K)=0.00693 *10*; α(L)=0.001055 *15*; α(M)=0.000223 *4*; α(N)=4.90×10^{-5} *7*; α(O)=7.72×10^{-6} *11* α(P)=4.91×10^{-7} *7* Mult.: K/L=7.0 *7* (1973Bu11), 7.0 *9* (1968Zh04).
[x]590.41[#e] *26*	0.25 *3*								%Iγ=0.130 *17*
672.83[@e] *24*	0.45 *5*	2827.7	(1,2,3)	2154.97	2^+				%Iγ=0.23 *3*
761.3 *5*	2.8 *5*	1313.53	4^+	552.05	2^+	E2		0.00372	%Iγ=1.5 *3*
841.3[@e] *3*	0.14 *2*	2154.97	2^+	1313.53	4^+				%Iγ=0.073 *11*
855.92[@e] *22*	0.27 *3*	3011.12?		2154.97	2^+				%Iγ=0.141 *17*
[x]900.1[@e] *6*	0.52 *6*								%Iγ=0.27 *4*
974.2[#] *5*	0.65 *9*	2066.71	2^+	1091.86	2^+				%Iγ=0.34 *5*
991.0[#e] *6*	0.32 *5*	2066.71	2^+	1075.9?					%Iγ=0.17 *3*
1000.8 *3*	9.6 *5*	1552.96	3^+	552.05	2^+	M1+E2	+0.97 *28*	0.00247 *15*	%Iγ=5.0 *3* α(K)exp=0.00153 *46* (1973Bu11) α(K)=0.00212 *13*; α(L)=0.000277 *15*; α(M)=5.8×10^{-5} *3*; α(N)=1.28×10^{-5} *7*; α(O)=2.07×10^{-6} *12*

γ(^{136}Ce) (continued)

E_{γ} $^{\dagger b}$	I_{γ} $^{\dagger c}$	E_i(level)	J^{π}_i	E_f	J^{π}_f	Mult.‡	$\delta^{\ddagger}$	α^{d}	Comments
									α(P)=1.57×10^{-7} 11 Mult.,δ: A_2=+0.27 4, A_4=−0.08 4 (2007Ah02).
$1012.2^{@e}$ 3	0.42 4	4023.3?	(1,2,3)	3011.12?					%Iγ=0.219 22
$1032.4^{@e}$ 6	0.20 4	4023.3?	(1,2,3)	2991.2?	$(2^+,3,4^+)$				%Iγ=0.104 21
$1041.5^{@e}$ 6	0.30 3	2595.2	(2^+)	1552.96	3^+				%Iγ=0.156 17
1063.2 7	0.40 4	2154.97	2^+	1091.86	2^+				%Iγ=0.208 22
1092.0 5	35.4 17	1091.86	2^+	0.0	0^+	E2		1.67×10^{-3}	%Iγ=18.4 10 α(K)exp=0.00129 19 (1973Bu11) α(K)=0.001434 21; α(L)=0.000190 3; α(M)=3.97×10^{-5} 6; α(N)=8.78×10^{-6} 13 α(O)=1.414×10^{-6} 20; α(P)=1.041×10^{-7} 15
1203.8 8	0.40 5	2517.1	$(2^+,3)$	1313.53	4^+				%Iγ=0.21 3 E_{γ}: other: 1206.0 10 (1971Ke07).
1282.4 7	0.25 3	2595.2	(2^+)	1313.53	4^+				%Iγ=0.130 17
1359.9 5	1.9 2	2451.07	(2^+)	1091.86	2^+				%Iγ=0.99 11
1368.3 6	0.34 4	2681.9	(2^+)	1313.53	4^+				%Iγ=0.177 22 E_{γ}: other: 1371.0 10 (1971Ke07).
1425.0 4	1.8 2	2517.1	$(2^+,3)$	1091.86	2^+				%Iγ=0.94 11
$^{x}1489.0^{@e}$ 7	0.22 3								%Iγ=0.115 16
1503.3 5	0.48 6	2595.2	(2^+)	1091.86	2^+				%Iγ=0.25 4 E_{γ}: other: 1501.6 6 (1971Ke07).
1514.8 4	3.7 4	2066.71	2^+	552.05	2^+	M1+E2	+0.46 8	1.17×10^{-3} 2	%Iγ=1.93 22 α(K)=0.000934 18; α(L)=0.0001184 22; α(M)=2.46×10^{-5} 5; α(N)=5.46×10^{-6} 10 α(O)=8.89×10^{-7} 17; α(P)=6.95×10^{-8} 14 Mult.,δ: A_2=−0.11 4, A_4=+0.08 4 (2007Ah02).
$^{x}1537.7^{\&e}$ 5	0.5^{b} 1								%Iγ=0.26 6
$^{x}1547.1^{e}$ 7	0.19 3								%Iγ=0.099 16
1590.3 8	<0.30	2681.9	(2^+)	1091.86	2^+				%Iγ=0.08 8
1602.8 3	7.5 6	2154.97	2^+	552.05	2^+	M1+E2	−0.41 8	1.08×10^{-3} 2	%Iγ=3.9 4 α(K)=0.000832 15; α(L)=0.0001053 19; α(M)=2.19×10^{-5} 4; α(N)=4.85×10^{-6} 9 α(O)=7.91×10^{-7} 15; α(P)=6.19×10^{-8} 12 Mult.,δ: A_2=+0.48 4, A_4=+0.005 44 (2007Ah02).
1628.2^{e} 7	0.21 3	2941.9?	(2^+)	1313.53	4^+				%Iγ=0.109 16
$^{x}1632.8^{\#e}$ 6	0.29 3								%Iγ=0.151 17
$^{x}1639.0^{\#e}$ 10	0.24 3								%Iγ=0.125 17
$^{x}1646.8^{\#e}$ 8	0.18 2								%Iγ=0.094 11
1677.9^{e} 7	0.28 3	2991.2?	$(2^+,3,4^+)$	1313.53	4^+				%Iγ=0.146 17
1735.7^{e} 4	0.83 9	2827.7	(1,2,3)	1091.86	2^+				%Iγ=0.43 5
$^{x}1748.7^{e}$ 4	0.30 3								%Iγ=0.156 17
1773.8 5	0.46 5	2865.9	$(1,2^+)$	1091.86	2^+				%Iγ=0.24 3

γ(^{136}Ce) (continued)

E$_{\gamma}$$^{\dagger b}$	I$_{\gamma}$$^{\dagger c}$	E$_i$(level)	J$^{\pi}_{i}$	E$_f$	J$^{\pi}_{f}$	Comments
1790.2^{e} *10*	0.18 *2*	2865.9	(1,2$^+$)	1075.9?		%Iγ=0.094 *11*
1812.8^{e} *10*	<0.20	2904.1	(1,2,3)	1091.86	2$^+$	%Iγ=0.05 *6* I$_{\gamma}$: other: 1.2 *1* (1971Ke07).
1886.7^{e} *9*	0.24 *3*	3201.3?	(2$^+$)	1313.53	4$^+$	%Iγ=0.125 *17*
1899.0 *5*	1.8 *4*	2451.07	(2$^+$)	552.05	2$^+$	%Iγ=0.94 *21*
1919.2^{e} *7*	0.21 *3*	3011.12?		1091.86	2$^+$	%Iγ=0.109 *16*
1965.2 *5*	0.30 *3*	2517.1	(2$^+$,3)	552.05	2$^+$	%Iγ=0.156 *17*
^{x}1971.0^{e} *10*	0.15 *2*					%Iγ=0.078 *11*
^{x}2021.1^{a} *4*	0.21 *2*					%Iγ=0.109 *11*
2042.7 *5*	1.4 *1*	2595.2	(2$^+$)	552.05	2$^+$	%Iγ=0.73 *6*
^{x}2059.0^{a} *5*	0.35 *3*					%Iγ=0.182 *17*
2066.8 *3*	5.7 *3*	2066.71	2$^+$	0.0	0$^+$	%Iγ=2.97 *18*
2082.4 *5*	0.35 *4*	3174.5	(1,2$^+$)	1091.86	2$^+$	%Iγ=0.182 *22*
2110.5^{e} *5*	0.25 *3*	3201.3?	(2$^+$)	1091.86	2$^+$	%Iγ=0.130 *17*
^{x}2113.2$^{\&e}$ *5*	0.5^{b} *1*					%Iγ=0.26 *6*
2131.1 *8*	0.40 *4*	2681.9	(2$^+$)	552.05	2$^+$	%Iγ=0.208 *22*
2140.9 *7*	0.35 *4*	3233.0	(1,2,3)	1091.86	2$^+$	%Iγ=0.182 *22*
2154.9 *3*	0.65 *7*	2154.97	2$^+$	0.0	0$^+$	%Iγ=0.34 *4*
2171.0 *6*	0.40 *4*	3264.1	(1,2$^+$)	1091.86	2$^+$	%Iγ=0.208 *22* E$_{\gamma}$: other: 2172.9 *4* (1971Ke07).
2189.0 *7*	0.40 *3*	3280.6	(1,2$^+$)	1091.86	2$^+$	%Iγ=0.208 *17*
2204.2^{e} *10*	0.15 *2*	3280.6	(1,2$^+$)	1075.9?		%Iγ=0.078 *11*
^{x}2216.2^{a} *4*	0.35 *4*					%Iγ=0.182 *22*
2240.7 *4*	1.3 *1*	2792.7	(1,2$^+$)	552.05	2$^+$	%Iγ=0.68 *6* E$_{\gamma}$: other: 2242.5 *2* (1971Ke07).
2270.2 *4*	0.68 *7*	3361.6	(1,2$^+$)	1091.86	2$^+$	%Iγ=0.35 *4*
2275.0^{a} *10*	0.45 *9*	2827.7	(1,2,3)	552.05	2$^+$	%Iγ=0.23 *5* E$_{\gamma}$: other: 2273.9 *7* (1971Ke07).
^{x}2291.7^{a} *5*	0.30 *3*					%Iγ=0.156 *17*
2313.7 *4*	1.20 *9*	2865.9	(1,2$^+$)	552.05	2$^+$	%Iγ=0.62 *5*
2351.9 *4*	0.57 *6*	2904.1	(1,2,3)	552.05	2$^+$	%Iγ=0.30 *4* E$_{\gamma}$: other: 2353.3 *4* (1971Ke07).
^{x}2370.0^{a} *7*	0.28 *3*					%Iγ=0.146 *17*
2379.8 *4*	0.55 *6*	2931.8	(1,2$^+$)	552.05	2$^+$	%Iγ=0.29 *4*
2389.5^{e} *10*	0.20 *2*	2941.9?	(2$^+$)	552.05	2$^+$	%Iγ=0.104 *11*
2439.5^{e} *10*	0.24 *2*	2991.2?	(2$^+$,3,4$^+$)	552.05	2$^+$	%Iγ=0.125 *12*
2450.8 *3*	1.35 *15*	2451.07	(2$^+$)	0.0	0$^+$	%Iγ=0.70 *8*
2460.4^{e} *5*	0.25 *3*	3011.12?		552.05	2$^+$	%Iγ=0.130 *17*
^{x}2463.5$^{\&}$ *3*	0.9^{b} *1*					%Iγ=0.47 *6*
2469.9^{ae} *5*	0.28 *3*	4023.3?	(1,2,3)	1552.96	3$^+$	%Iγ=0.146 *17* I$_{\gamma}$: other: 1.0 *1* (1971Ke07).

γ(^{136}Ce) (continued)

E_γ[†][b]	I_γ[†][c]	E_i(level)	J^π_i	E_f	J^π_f	Comments
[x]2559.2[a] *4*	0.29 *3*					%Iγ=0.151 *17*
2596.0[e] *7*	0.30 *3*	2595.2	(2$^+$)	0.0	0$^+$	%Iγ=0.156 *17*
[x]2596.9[&] *4*	0.6[b] *1*					%Iγ=0.31 *6*
2613.1 *8*	0.20 *2*	3705.3	(1,2,3)	1091.86	2$^+$	%Iγ=0.104 *11*
2622.7 *8*	0.25 *2*	3174.5	(1,2$^+$)	552.05	2$^+$	%Iγ=0.130 *12*
2647.8[e] *8*	0.10 *2*	3201.3?	(2$^+$)	552.05	2$^+$	%Iγ=0.052 *11*
2681.0[&e] *3*	0.8[b] *1*	3233.0	(1,2,3)	552.05	2$^+$	%Iγ=0.42 *6*
2681.3[e] *5*	0.25 *3*	2681.9	(2$^+$)	0.0	0$^+$	%Iγ=0.130 *17* E_γ: other: 2863.5 *4* (1971Ke07). I_γ: other: 0.7 *1* (1971Ke07).
2713.3[&e] *5*	0.5[b] *1*	3264.1	(1,2$^+$)	552.05	2$^+$	%Iγ=0.26 *6*
2728.7 *7*	0.25 *3*	3280.6	(1,2$^+$)	552.05	2$^+$	%Iγ=0.130 *17* E_γ: other: 2730.3 *3* (1971Ke07).
2792.6 *7*	0.21 *2*	2792.7	(1,2$^+$)	0.0	0$^+$	%Iγ=0.109 *11* E_γ: other: 2795.0 *5* (1971Ke07).
2808.7 *5*	0.35 *4*	3361.6	(1,2$^+$)	552.05	2$^+$	%Iγ=0.182 *22* E_γ: other: 2810.1 *3* (1971Ke07).
[x]2844.1[a] *3*	0.19 *2*					%Iγ=0.099 *11*
2866.4[&e] *7*	0.20[b] *5*	2865.9	(1,2$^+$)	0.0	0$^+$	%Iγ=0.10 *3*
2931.3 *9*	0.16 *2*	2931.8	(1,2$^+$)	0.0	0$^+$	%Iγ=0.083 *11*
2942.1[e] *7*	0.10 *2*	2941.9?	(2$^+$)	0.0	0$^+$	%Iγ=0.052 *11*
[x]2981.6[e] *9*	0.15 *2*					%Iγ=0.078 *11*
3027.0[e] *10*	<0.10	3579.4	(1,2$^+$)	552.05	2$^+$	%Iγ=0.03 *3* I_γ: other: 0.40 *6* (1971Ke07).
[x]3036.3[a] *7*	<0.10					%Iγ=0.03 *3*
3153.6 *8*	0.10 *1*	3705.3	(1,2,3)	552.05	2$^+$	%Iγ=0.052 *6*
3174.9 *8*	0.12 *2*	3174.5	(1,2$^+$)	0.0	0$^+$	%Iγ=0.062 *11*
3200.6[e] *8*	0.14 *2*	3201.3?	(2$^+$)	0.0	0$^+$	%Iγ=0.073 *11*
3262.7 *8*	0.85 *9*	3264.1	(1,2$^+$)	0.0	0$^+$	%Iγ=0.44 *5* E_γ: other: 3265.2 *3* (1971Ke07).
3280.3 *10*	0.12 *2*	3280.6	(1,2$^+$)	0.0	0$^+$	%Iγ=0.062 *11* E_γ: other: 3283.3 *10* (1971Ke07).
3362.0 *10*	0.11 *2*	3361.6	(1,2$^+$)	0.0	0$^+$	%Iγ=0.057 *11*
3471.1[e] *10*	0.22 *2*	4023.3?	(1,2,3)	552.05	2$^+$	%Iγ=0.115 *11*
3579.6 *10*	0.15 *2*	3579.4	(1,2$^+$)	0.0	0$^+$	%Iγ=0.078 *11*
[x]3709.0 *10*	0.15 *2*					%Iγ=0.078 *11*

[†] From 1973Bu11, except where noted. 1973Bu11 note that there are problems in some of the Iγ′s of 1971Ke07 (Eγ>1 MeV) caused by sum peaks and single- and double-escape peaks. Evaluator notes that for energies 2 MeV and larger, γ-ray energies from 1971Ke07 are systematically 2-3 keV larger than those from

γ(^{136}Ce) (continued)

1973Bu11.

[‡] From the Adopted Gammas. Support for cases where mult. and δ were determined in this dataset is indicated in the comments.

[#] Assigned by 1973Bu11 to A=136 chain but isotope not identified.

[@] Assigned by 1973Bu11 to A=136 chain. Transition with similar energy assigned to ^{136}Nd ε decay (evaluator).

[&] Observed only by 1971Ke07.

[a] These gammas decay with $T_{1/2}$ consistent with ^{136}Pr decay but are not observed in coincidence with other gammas and do not correspond to a g.s. transition from a known level (1971Ke07).

[b] From 1971Ke07.

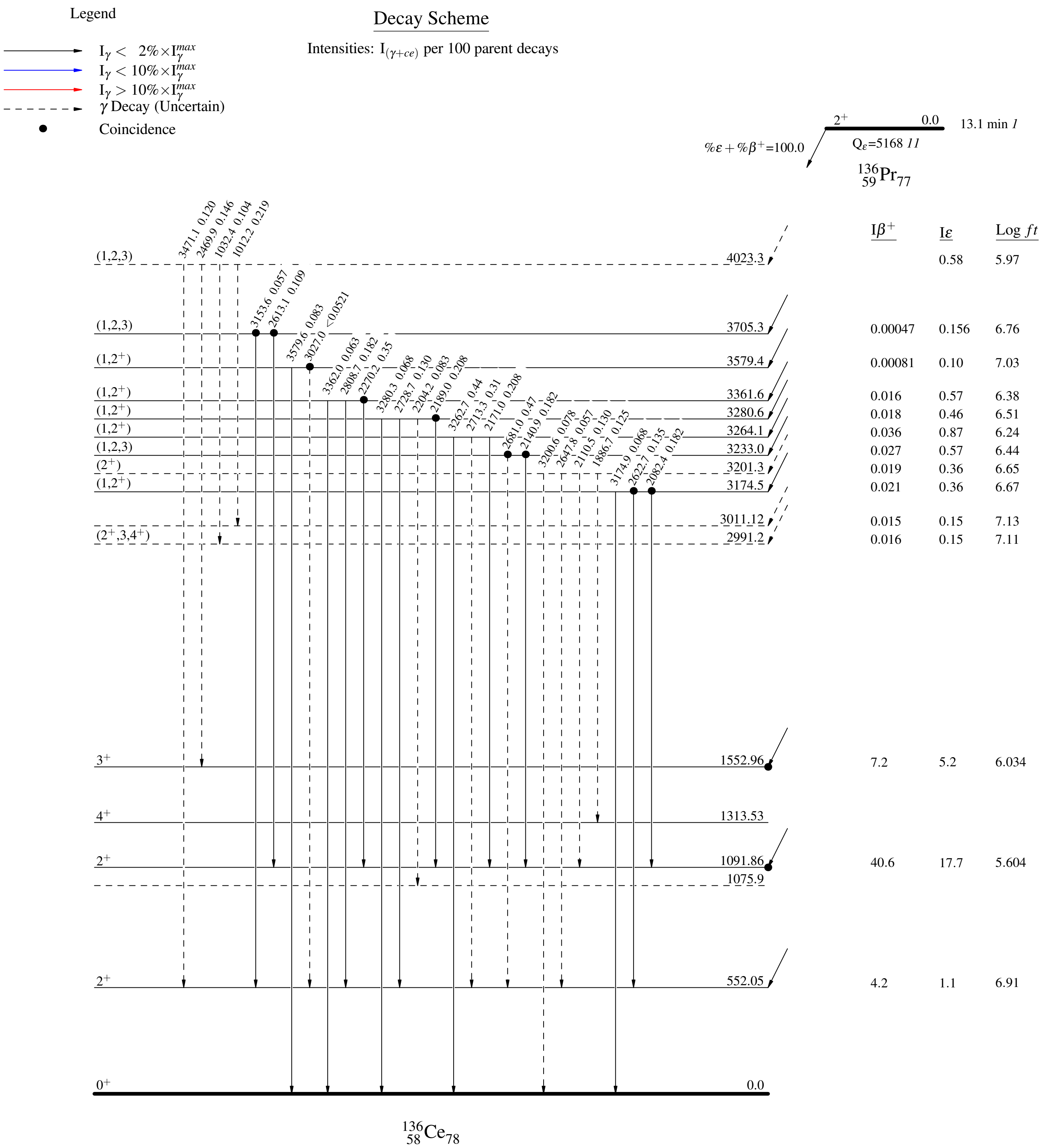
[c] For absolute intensity per 100 decays, multiply by 0.521 *17*.

[d] 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.

[e] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

^{136}Pr ε decay 2007Ah02,1973Bu11,1971Ke07



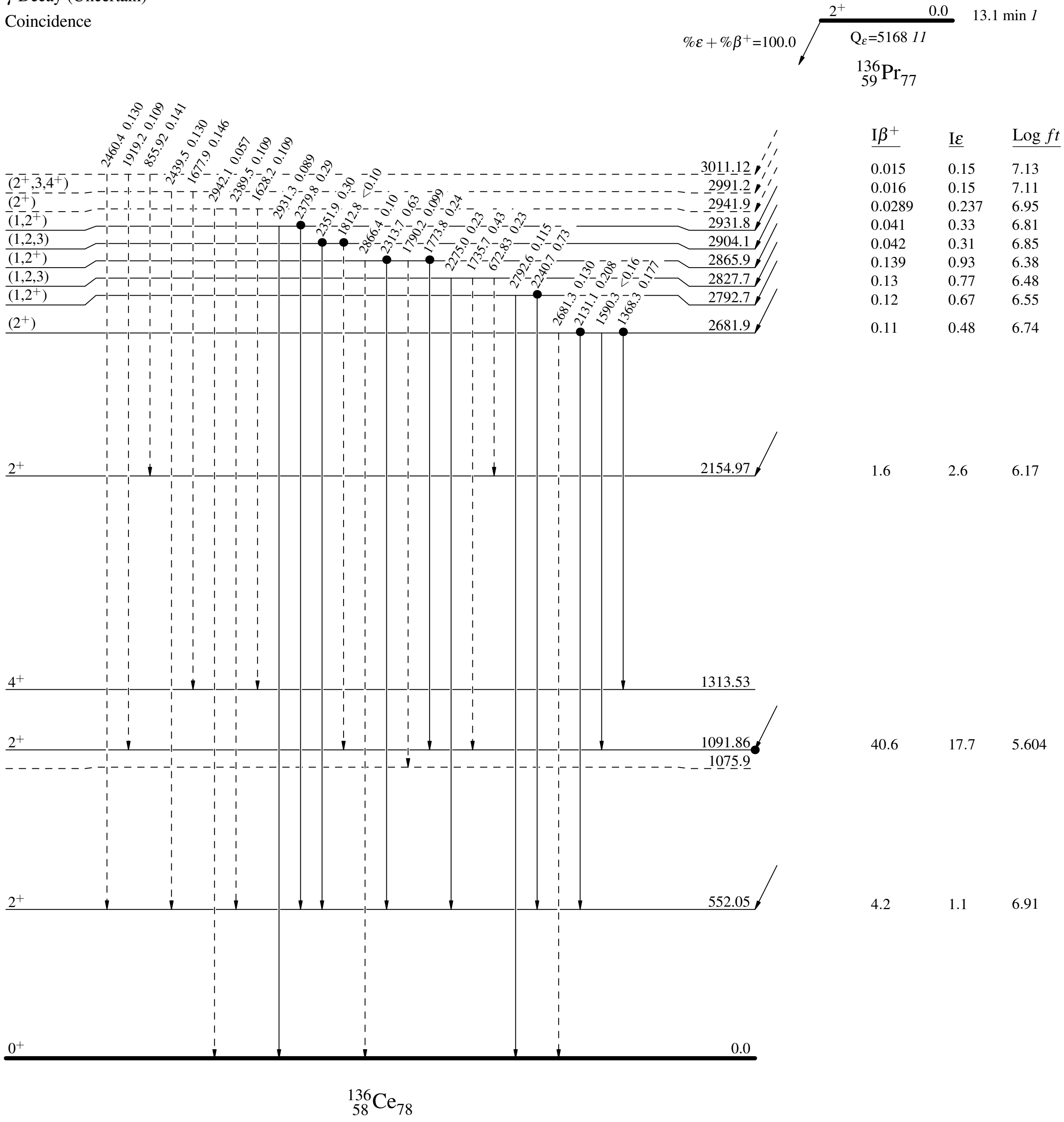
^{136}Pr ε decay 2007Ah02,1973Bu11,1971Ke07

Decay Scheme (continued)

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

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- ● Coincidence



Level	$I\beta^+$	$I\varepsilon$	Log *ft*
3011.12	0.015	0.15	7.13
2991.2	0.016	0.15	7.11
2941.9	0.0289	0.237	6.95
2931.8	0.041	0.33	6.81
2904.1	0.042	0.31	6.85
2865.9	0.139	0.93	6.38
2827.7	0.13	0.77	6.48
2792.7	0.12	0.67	6.55
2681.9	0.11	0.48	6.74
2154.97	1.6	2.6	6.17
1091.86	40.6	17.7	5.604
552.05	4.2	1.1	6.91

^{136}Pr ε decay 2007Ah02,1973Bu11,1971Ke07

Decay Scheme (continued)

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

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- ● Coincidence