		History	
Туре	Author	Citation	Literature Cutoff Date
Full Evaluation	A. A. Sonzogni	NDS 103, 1 (2004)	31-Jul-2004

Parent: ¹³⁴La: E=0.0; $J^{\pi}=1^+$; $T_{1/2}=6.45 \text{ min } 16$; $Q(\varepsilon)=3731 \ 20$; $\%\varepsilon+\%\beta^+$ decay=100.0

¹³⁴Ba Levels

The decay scheme is based mainly on $\gamma\gamma$ -coincidence data. Others: 1973Al20, 1976Me21, 1987PaZS.

E(level)	$J^{\pi \dagger}$	T _{1/2}	E(level)	J^{π}	E(level)	$J^{\pi \dagger}$
0.0	0^{+}	stable	2570.87 <i>3</i>	$1^{(+)}$	3068.85? 13	$1,2^{+}$
604.7222 19	2+		2599.87 4	2+	3074.73? 13	(2)
1167.970 4	2+		2656.23 8	(2^{+})	3086.75 11	$1^+, 2^+$
1400.589 5	4+		2696.58 5	1,2	3160.08 15	$1,2^{+}$
1643.336 4	3+		2729.23 4	$1,2^{+}$	3216.3? 6	$1,2^{+}$
1760.555 22	0^{+}		2747.965 24	2+	3245.88 19	(1^{+})
2029.241 18	2^{+}		2758.9? <i>3</i>	$1,2^{+}$	3272.10 5	$1^{-}, 2^{-}$
2088.288 17	2^{+}		2760.74 12	1,2	3327.25 13	(1^{+})
2159.685 21	$(0)^{+}$		2828.50 4	$1^+, 2^+$	3368.97 6	1,2
2254.95 14	3-		2851.26 6	2+	3408.75 17	1,2
2334.76 6	$1,2^{+}$		2887.04 4	1,2	3432.15? 10	$1,2^{+}$
2336.82 <i>3</i>	0^{+}		2917.61 6	2	3450.27 8	(1^{+})
2379.114 18	0^{+}		2938.93 20	1+	3471.1? <i>3</i>	$1,2^{+}$
2488.676 23	0^{+}		3004.41 15	$1,2^{+}$	3499.68 14	(1,2)
2536.91 5	0 to 2		3027.39 6	(1^{+})	3548.5 <i>4</i>	$1,2^{+}$
2564.715 19	$1^+, 2^+$		3061.29 6	$2^{(+)}$	3652.1? 5	$1,2^{+}$

[†] From Adopted Levels.

 ε, β^+ radiations

%ε=37.7 18, % β^+ =62.3 18 (1976Gr11). ε(K)/ β^+ =0.44 3 (1965Bi12), 0.52 4 (1976Gr11).

E(decay)	E(level)	$\mathrm{I}\varepsilon^{\dagger}$	Log ft	$\mathrm{I}(\varepsilon + \beta^+)^{\dagger}$
(79 20)	3652.1?	0.000023 11	7.3 5	0.000023 11
(183 20)	3548.5	0.000101 17	7.61 15	0.000101 17
(231 20)	3499.68	0.00041 5	7.25 11	0.00041 5
(260 20)	3471.1?	0.00024 4	7.59 11	0.00024 4
(281 20)	3450.27	0.00064 10	7.24 10	0.00064 10
(299 20)	3432.15?	0.00022 6	7.77 14	0.00022 6
(322 20)	3408.75	0.0029 4	6.72 9	0.0029 4
(362 20)	3368.97	0.0033 5	6.78 9	0.0033 5
(404 20)	3327.25	0.00135 20	7.27 9	0.00135 20
(459 20)	3272.10	0.0048 4	6.84 <i>6</i>	0.0048 4
(485 20)	3245.88	0.00019 4	8.29 10	0.00019 4
(515 20)	3216.3?	0.00040 16	8.03 18	0.00040 16
(571 20)	3160.08	0.00051 4	8.02 5	0.00051 4
(644 20)	3086.75	0.0015 3	7.66 10	0.0015 3
(656 20)	3074.73?	0.0028 6	7.40 10	0.0028 6
(662 20)	3068.85?	0.0014 4	7.71 13	0.0014 4
(670 20)	3061.29	0.00312 20	7.38 4	0.00312 20

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		134	La ε decay (6.4	l5 min) 19	73MeZN,1976G	r11 (continued)
				ϵ, β^+ radiation	ns (continued)	
E(decay)	E(level)	$\mathrm{I}\beta^+$ [†]	$\mathrm{I}arepsilon^\dagger$	Log <i>ft</i>	$\mathrm{I}(\varepsilon + \beta^+)^{\dagger}$	Comments
(704 20)	3027.39		0.00055 4	8.17 5	0.00055 4	
(727 20)	3004.41		0.00171 21	7.71 6	0.00171 21	
(792 20)	2938.93		0.0028 2	7.57 4	0.0028 2	
(813 20)	2917.61		0.0051 6	7.34 6	0.0051 6	
(844 20)	2887.04		0.0175 9	6.84 <i>4</i>	0.0175 9	
(880 20)	2851.26		0.0048 3	7.44 <i>4</i>	0.0048 3	
(903 20)	2828.50		0.0227 10	6.78 <i>3</i>	0.0227 10	
(970 20)	2760.74		0.0045 3	7.55 4	0.0045 3	
(972 20)	2758.9?		0.00042 4	8.58 5	0.00042 4	
(983 20)	2747.965		0.0443 20	6.57 <i>3</i>	0.0443 20	
(1002 20)	2729.23		0.0319 12	6.73 <i>3</i>	0.0319 12	
(1034 20)	2696.58		0.0154 7	7.07 3	0.0154 7	
(1075 20)	2656.23		0.0101 11	7.29 6	0.0101 11	
(1131 20)	2599.87		0.093 4	6.37 <i>3</i>	0.093 4	
(1160 20)	2570.87		0.0325 14	6.85 <i>3</i>	0.0325 14	
(1166 20)	2564.715		0.137 6	6.23 <i>3</i>	0.137 6	
(1194 20)	2536.91		0.0076 5	7.51 4	0.0076 5	
(1242 20)	2488.676		0.086 4	6.49 <i>3</i>	0.086 4	
(1352 20)	2379.114	0.00019 5	0.168 7	6.277 25	0.168 7	av E β =158.6
(1394 20)	2336.82	0.00047 11	0.254 10	6.125 24	0.254 10	av E β =177.2
(1396 20)	2334.76	$3.0 \times 10^{-5} 8$	0.0159 12	7.33 4	0.0159 12	av E β =178.1
(1476 20)	2254.95	$<3.\times10^{-6}$	< 0.0008	>8.7	< 0.0008	av E β =213.3
(1571 20)	2159.685	0.0036 6	0.416 17	6.016 24	0.420 17	av E β =255.0
(1643 20)	2088.288	0.0030 4	0.216 9	6.340 24	0.219 9	av E β =286.1
(1702 20)	2029.241	0.0041 5	0.212 8	6.380 23	0.216 8	av E β =311.9
(1970 20)	1760.555	0.00209 19	0.0324 18	7.32 3	0.0345 19	av E β =429.6
(2563 20)	1167.970	0.019 2	0.057 7	7.31 6	0.076 9	av E β =692.4
(3126 20)	604.7222	1.56 8	1.78 9	5.99 <i>3</i>	3.34 16	av E β =946.9
(3731 20)	0.0	62.0 5	32.7 5	4.883 16	94.71 21	av Eβ=1224.4 Eβ=2670 30 (1973A120), 2750 50

(1965Bi12).

[†] Absolute intensity per 100 decays.

$\gamma(^{134}\text{Ba})$

Iv normalization: From Iv(604.7)=5.04% 17 (1976Gr11). I(γ^{\pm})=2390 100, I(K x ray)=576 40. α (K)exp=ce(K)/Iv normalized to α (K)(604.7)=0.00503 (E2 1968Ha53). ce(K): from 1973Al20.

E_{γ}^{\dagger}	$I_{\gamma}^{\ddagger a}$	E_i (level)	\mathbf{J}_i^{π}	E_f	\mathbf{J}_f^{π}	Mult.	α b	Comments
475.365 2	0.11 3	1643.336	3+	1167.970	2^{+}			
563.246 5	7.18 12	1167.970	2^{+}	604.7222	2^{+}	M1+E2		
592.58 <i>3</i>	0.34 2	1760.555	0^{+}	1167.970	2^{+}			
604.721 2	100 2	604.7222	2^{+}	0.0	0^{+}	[E2]	0.00599	$\alpha(K)=0.00503; \alpha(L)=0.00072$
659.85 9	0.051 5	2747.965	2^{+}	2088.288	2^{+}			
718.71 <i>3</i>	0.239 15	2747.965	2^{+}	2029.241	2^{+}			
795.864 4	0.169 10	1400.589	4^{+}	604.7222	2^{+}			
^x 832.0 [@] 3	0.09 2							
854.1 ^{@e} 3	< 0.01	2254.95	3-	1400.589	4^{+}			
861.29 5	0.065 16	2029.241	2+	1167.970	2^{+}			

Continued on next page (footnotes at end of table)

¹³⁴La ε decay (6.45 min) 1973MeZN,1976Gr11 (continued)

γ ⁽¹³⁴Ba) (continued)</sup>

E_{γ}^{\dagger}	$I_{\gamma}^{\ddagger a}$	E _i (level)	\mathbf{J}_i^π	E_f	\mathbf{J}_f^{π}	Mult.	$\alpha^{\boldsymbol{b}}$	Comments
920.352 23	0.376 12	2088.288	2+	1167.970	2^{+}			
^x 973.32 [@] 6	0.14 1							
991.73 4	0.15 3	2159.685	$(0)^{+}$	1167.970	2^{+}	[E2]		
$x_{1014.5}^{@} 5$	0.011 5							
1017.3 [@] 2	0.011 5	3272.10	$1^{-}, 2^{-}$	2254.95	3-			
1038.610 7	0.093 18	1643.336	3+	604.7222	2+			
^x 1046.4 ^w 5	0.025 9							
^x 1070.1 [@] 5	0.02 1							
^x 1083.7 [@] 7	0.003 1							
1087.8 ^{^w} 3	0.014 7	2254.95	3-	1167.970	2^{+}			
1104.5 ^{@} 5	0.054 12	2747.965	2^{+}	1643.336	3+			
1114.3 [@] 6	0.040 9	3368.97	1,2	2254.95	3-	0		
1155.83 <i>3</i>	0.360 18	1760.555	0^{+}	604.7222	2^{+}	E2	0.00134	$\alpha(K)=0.00115; \alpha(L)=0.00015$
1167.968 5	1.57 5	1167.970	2^{+}	0.0	0^+	E2	0.00131	$\alpha(K)=0.00112; \ \alpha(L)=0.00014$
						0		α (K)exp: average for 1168.0 γ and 1168.6 γ .
1168.63 8	0.39 5	2336.82	0+	1167.970	2+	E2 ^{&}	0.00131	α (K)=0.00112; α (L)=0.00014 α (K)exp: average for 1168.0 γ and 1168.6 γ .
^x 1181.3 [@] 5	0.005 4							
1184.92 12	0.035 4	2828.50	$1^+, 2^+$	1643.336	3+			
1211.154 22	2.37 5	2379.114	0^{+}	1167.970	2^{+}	E2 ^{&}	0.00122	α (K)=0.00104; α (L)=0.00013
1243.84 [°] 21	0.044° 9	2887.04	1,2	1643.336	3+			
1243.84 ^{cc} 21	0.044 9	3004.41	$1,2^+$	1/60.555	0^{+}			
$x_{1260,1}^{e}$ 6	0.028 3	2030.23	(2)	1400.369	4			
1307.0 7	0.015 7	3068.85?	$1,2^{+}$	1760.555	0^{+}			
1320.707 23	1.64 4	2488.676	0^{+}	1167.970	2+	E2 <mark>&</mark>	0.00102	$\alpha(K)=0.00087; \alpha(L)=0.00011$
^x 1331.8 [@] 3	0.026 9							
1347.34 5	0.100 6	2747.965	2+	1400.589	4+			
1368.96 7	0.066 5	2536.91	0 to 2	1167.970	2^{+}			
^x 1373.5 ^{@e} 5	0.0005 2							
1396.730 22	0.71 2	2564.715	$1^+, 2^+$	1167.970	2+	M1,E2		
1402.89 4	0.210 8	2570.87	2 ⁺	604 7222	2+ 2+	$M1\pm F2$		
1431.35 ^{ce} 13	0.044° 9	2599.87	$\frac{2}{2^{+}}$	1167.970	$\frac{2}{2^{+}}$	WITTE2		
1431.35 [°] 13	0.044 ^c 9	3074.73?	(2)	1643.336	3+			
1483.52 <i>3</i>	2.88 6	2088.288	2+	604.7222	2+	M1+E2		
1488.3 3	0.072 18	2656.23	(2^{+})	1167.970	2+			
x1499.3 ^{we} 3	0.015 9							
1517.09 ^{••} 15 1528.54 7	0.033 9 0.052 4	2917.61 2696.58	2 1.2	1400.589 1167.970	4^+ 2 ⁺			
1554.946.24	8.18.7.5	2159.685	$(0)^+$	604.7222	2+	E2 ^{&}		
$1561.4^{@}4$	0.025 3	2729.23	1.2+	1167.970	2+			
1579.92 15	0.120 10	2747.965	2+	1167.970	$\bar{2}^{+}$			
1591.1 ^e 11	0.018 6	2758.9?	$1,2^{+}$	1167.970	2^{+}			
1649.97 [@] 23	0.021 3	2254.95	3-	604.7222	2^{+}			
1660.57 ^d 7	0.058 ^d 5	2828.50	$1^+, 2^+$	1167.970	2^{+}			
1660.57 ^{de} 7	< 0.058 ^d	3061.29	$2^{(+)}$	1400.589	4^{+}			

		¹³⁴ I	La ε deca	y (6.45 min)	1	973MeZN,	1976Gr11 (continued)
				$\gamma(^{13}$	⁴ Ba)	(continued	<u>)</u>
E_{γ}^{\dagger}	$I_{\gamma}^{\ddagger a}$	E _i (level)	J_i^π	E_f	\mathbf{J}_f^{π}	Mult.	Comments
1674.6 5	0.012 5	3074.73?	(2)	1400.589	4+		
1683.33 7	0.062 4	2851.26	2+	1167.970	2^{+}		
1719.05 6	0.132 8	2887.04	1,2	1167.970	2+		
^x 1730.05 [@] 7	0.28 2						
1730.05 7	0.28 2	2334.76	1,2+	604.7222	2+	0 -	
1732.12 3	4.65 9	2336.82	0^+	604.7222	2^+	E2 ^X	
1/49.41 13	0.027 3	2917.61	2	1167.970	21	50	
1/59.9" /	0.042.7	1/60.555	1.2	0.0	0' 3+	E0	$1\gamma < 0.08, \alpha(K) \exp > 0.1.$
1703.71 22	0.042 7	2370 11/	0+	604 7222	2+	E2&	
^x 1800.8 ^e 5	0.013 6	2379.114	0	004.7222	2	62	
1836.43 15	0.034 4	3004.41	$1,2^{+}$	1167.970	2^{+}		
1859.43 ^e 6		3027.39	(1^+)	1167.970	2^{+}		E_{γ} : γ not observed in (γ, γ') and $(n, n'\gamma)$
1000 54 10	0.067.5	2400 (7)	0±	(04 5333	a +		experiments.
1883.74 <i>12</i>	0.067 5	2488.676	0	604.7222	21		
^1890.8 ° 6	0.0012 8	20(1.20	$2(\pm)$	11(7.070	2+		
1893.35 9	$0.048 \ 3$	3061.29	$2^{(+)}$ 1+2+	1167.970	2+ 2+		
1918.0 5	0.014 4 0.084 6	2536.91	1,2 0 to 2	604 7222	$\frac{2}{2^{+}}$		
1952.10 0	1.90 4	2564.715	$1^+, 2^+$	604.7222	2^{+}	M1,E2	
1966.09 11	0.073 10	2570.87	$1^{(+)}$	604.7222	2^{+}	,	
1995.14 4	1.78 4	2599.87	2^{+}	604.7222	2^{+}	M1+E2	
2029.19 4	0.770 16	2029.241	2+	0.0	0^+	E2	
$x^{2040.0}^{@} 5$	0.0004 1						
2051.51 9	0.120 10	2656.23	(2^{+})	604.7222	2+		
[*] 2064.4° 5	0.012 4	2000 200	2+	0.0	0+		
2088.20 4	0.193.8	2696.58	1.2	604.7222	2^+		
2104.09 6	0.063 4	3272.10	$1^{-},2^{-}$	1167.970	$\tilde{2}^{+}$		
2124.49 4	0.608 10	2729.23	$1,2^{+}$	604.7222	2^{+}		
2143.24 5	0.314 10	2747.965	2+	604.7222	2^+	M1+E2	
2156.00 <i>12</i>	0.089 4	2/60./4	1,2	604.7222	21		
2159.5 ^{dc} 5	≤0.009 ^d	2159.685	(0)	0.0	0'		
2159.5° 5	0.009^{43}	3327.25	(1^{+}) 1+2+	1167.970	2^+	M1 E2	
2223.774	0.010 3	2828.30	1,2 12	1167 970	$\frac{2}{2^{+}}$	WI1,EZ	
2246.7 4	0.011 2	2851.26	2+	604.7222	$\bar{2}^{+}$		
2282.30 5	0.171 6	2887.04	1,2	604.7222	2^{+}		
2312.91 7	0.0420 22	2917.61	2	604.7222	2+		
x2329.0 ^{@e} 9	≤0.004	2020.02	4 ±	(0.1.5222)	0 +		
2334.7° 4	0.035 4	2938.93	1-	604.7222	2+		
2334.71° 9	0.035 4	2334.76	1,2	0.0	0'	50	L 0.025 (II) 0.002
2335" 3 x2245 56 21	0.012.2	2336.82	0+	0.0	0^{+}	E0	$1\gamma < 0.035, \alpha(K) \exp > 0.003.$
$2343.30\ 21$	0.015 5	2270 114	0+	0.0	0+	EO	$L_{1} < 0.009 = o(K) over 0.12$
2379.0° 13 x2442.68.26	0.0085.13	2319.114	0	0.0	0.	EU	$r_{\gamma}<0.000$, $u(\mathbf{x})exp>0.12$.
24562^{2} 5	0.003 1	3061.29	$2^{(+)}$	604 7222	2+		
2464.15 13	0.0125 22	3068.85?	$1,2^{+}$	604.7222	2+		
2482.24 17	0.010 3	3086.75	1+,2+	604.7222	2^{+}		
2487.0 [#] 15		2488.676	0^{+}	0.0	0^+	E0	$I\gamma < 0.018, \alpha(K) \exp > 0.025.$
2564.84 7	0.106 7	2564.715	$1^+, 2^+$	0.0	0^+		α (K)exp: average for 2564 γ and 2570 γ

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134 La ε decay (6.45 min) 1973MeZN,1976Gr11 (continued)

$\gamma(^{134}\text{Ba})$ (continued)

E_{γ}^{\dagger}	$I_{\gamma}^{\ddagger a}$	E _i (level)	\mathbf{J}_i^{π}	E_f	\mathbf{J}_f^{π}	Comments
						consistent with E1, M1, or E2 for either or both transitions. Placement requires $\Delta \pi = no$.
2570.85 5	0.361 10	2570.87	$1^{(+)}$	0.0	0^+	α (K)exp: average for 2564 γ and 2570 γ consistent with E1, M1 or E2 for either or both transitions.
2599.84 6	0.061 9	2599.87	2+	0.0	0^+	
2612.3 [@] 9	0.0009 4	3216.3?	$1,2^{+}$	604.7222	2^{+}	
^x 2652.4 [@] 3	0.002 1					
2656.11 18	0.0089 12	2656.23	(2^{+})	0.0	0^{+}	
2667.37 9	0.0220 14	3272.10	1-,2-	604.7222	2^+	
2696.52 /	0.060 3	2696.58	1,2	0.0	$\frac{0}{2^+}$	
2722.5 5 2729 ^e	<0.06	2729.23	(1^{-}) 1 2 ⁺	0.0	0^{+}	
2729 2748 1 [@] 5	0.00033.7	2727.25	2+	0.0	0+	
2758.9.3	0.0083 6	2758.9?	1.2^{+}	0.0	0^{+}	
$2764\ 22^{@}\ 6$	0.024 1	3368.97	1.2	604 7222	2+	
^x 2788.72 21	0.004 2	5500.77	1,2	001.7222	2	
2803.5 3	0.0054 6	3408.75	1,2	604.7222	2^{+}	
^x 2816.8 [@] 4	0.0025 8					
^x 2824.08 25	0.006 1					
2827.4 [@] 1	0.004 1	3432.15?	$1,2^{+}$	604.7222	2^{+}	
2828.1 3	0.0007 2	2828.50	$1^+, 2^+$	0.0	0^{+}	
2845.6 [@] 5	0.002 1	3450.27	(1^{+})	604.7222	2^{+}	
2851.05 12	0.022 1	2851.26	2+	0.0	0+	
2866.4 ^{^w} 3	0.0045 6	3471.1?	1,2+	604.7222	2+	
2894.92 14	0.0082 8	3499.68	(1,2)	604.7222	2+	
^x 2899.7 [@] 6	0.0011 5					
^x 2923.6 [@] 6	0.0011 4	2020.02	1+	0.0	0+	
2938.92	0.055 3	2938.93	1 0+	0.0	0^{+}	
2943.3 8	0.0014 3	3548.5	1,21	604.7222	2	
*2951.8 7	0.0012 6	2027 20	(1+)	0.0	0+	
$3027.11\ 10$	0.0110 7	2652 12	(1)	0.0	0 2+	
3047.4 - 3	0.0004 2	3032.1?	1,2	604.7222	2	
*3055.2° 5	0.0009 2	20(1.20	$2(\pm)$	0.0	0+	
3061.23 8	0.0109 10	3061.29	1+ 2+	0.0	0^{+}	
3160.04.15	0.0039 9	3160.08	1,2 $1,2^+$	0.0	0^{+}	
$3215.7^{@}.8$	0.007.3	3216 32	$1,2^+$	0.0	0+	
3245.84 19	0.0037 8	3245.88	(1^+)	0.0	0^{+}	
3327.18 15	0.010 2	3327.25	(1^+)	0.0	0^{+}	
3368.8 [@] 6	0.0006 2	3368.97	1,2	0.0	0^+	
3432.1 [@] 7	0.0004 1	3432.15?	$1,2^{+}$	0.0	0^{+}	
3450.22 [@] 8	0.0107 16	3450.27	(1^{+})	0.0	0^{+}	
3471.0 [@] 5	0.0002 1	3471 12	1.2+	0.0	0^{+}	
x3509 4 [@] 10	0.0003 1	01/111	-,	0.0	0	
$3548.5^{@} 4$	0.0006 1	3548 5	1 2+	0.0	0^{+}	
$x_{3500} \cap \frac{@e}{2} \cap$	0.0003 2	5570.5	1,2	0.0	U	
3370.0 9	0.0005 2	3652 19	1.2+	0.0	0+	
5052.0 - 10	0.00003 4	3032.14	1,2	0.0	0.	

¹³⁴La ε decay (6.45 min) 1973MeZN,1976Gr11 (continued)

$\gamma(^{134}\text{Ba})$ (continued)

[†] Averaged from 1976Gr11 and 1980VyZZ, except as noted.

[±] Averaged from 1980VyZZ, 1976Gr11, and 1973MeZN.

[#] Only conversion electrons observed.

[@] From 1973MeZN.

& M1,E2 from $\alpha(K)$ exp. M1 ruled out from placement in level scheme.

^a For absolute intensity per 100 decays, multiply by 0.0504 17.

^{*b*} 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.

^c Multiply placed with undivided intensity.

^d Multiply placed with intensity suitably divided.

^e Placement of transition in the level scheme is uncertain.

^{*x*} γ ray not placed in level scheme.









Decay Scheme (continued)

