

$^{144}\text{Cs} \beta^-$ decay **1980Sc16**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	A. A. Sonzogni	NDS 93, 599 (2001)	1-Dec-2000

Parent: ^{144}Cs : $E=0.0$; $J^\pi=1$; $T_{1/2}=0.994$ s 4; $Q(\beta^-)=8464$ 27; $\% \beta^-$ decay=?

1980Sc16: mass separation, measured γ , $\gamma\gamma$, $\gamma\gamma(\theta)$, $\theta=90^\circ-180^\circ$; Ge(Li), FWHM=2 at 1.33 MeV.

1990Ma25: Measured $T_{1/2}$ using β - γ - γ fast timing method.

1976MoZB, **1978MoZQ**:

Activity: on-line mass separation of fission products.

Measured: γ (semi), ce (semi), $\gamma\gamma$ (semi-semi), $\beta\gamma$ (scin-semi), $\gamma\gamma(t)$ (scin-scin) (**1976MoZB**).

Other measurements (deduced $Q(\beta^-)$ from $\beta\gamma$): **1974Wu02**, **1981Ke07**, **1981De25**, **1992Pr04**.

 ^{144}Ba Levels

E(level)	J^π [†]	$T_{1/2}$ [‡]	Comments
0.0	0 ⁺	11.5 s 2	$T_{1/2}$: from Adopted Levels.
199.4	2 ⁺	0.71 ns 3	$g=0.34$ 5 (1983Wo05) g -factor from $(821\gamma)(199\gamma)(\theta, H)$ (1983Wo05) calculated for adopted $T_{1/2}=0.70$ ns 3. $T_{1/2}$: other 0.85 ns 15 (1976MoZB) from $\beta\gamma(t)$, $\gamma\gamma(t)$ (1976MoZB) scin-scin.
530.3	4 ⁺	34 ps 5	J^π : (4 ⁺). $\gamma\gamma(\theta)$ consistent with with 4-2-0 cascade.
759.0	1 ⁽⁻⁾	<24 ps	J^π : 1. J=1 or 3 consistent with $\gamma(\theta)$; J=3 eliminated due to the strong 759 γ to g.s..
838.4	3 ⁽⁻⁾	<10 ps	J^π : 3 or 1 from $\gamma(\theta)$; strong 308 γ to 4 ⁺ eliminates J=1.
1020.1	0 ⁺		J^π : 0 from 0-2-0 cascade observed in $\gamma(\theta)$.
1315.7	(2)		J^π : 2 from $\gamma(\theta)$.
1837.6			
1848.2	2 ⁽⁺⁾		
1864.2	2 ⁺		J^π : 2 from $\gamma(\theta)$, confirmed by gammas to 0 ⁺ and 4 ⁺ .
2212.4	(2) ⁺		J^π : 2 from $\gamma(\theta)$; $\pi=+$ from M1 or E2 to 2 ⁺ .
2375.4	(1 ⁺ , 2 ⁺)		J^π : 1 or 2 with J=1 preferred.

[†] From Adopted Levels; supporting assignments based $\gamma\gamma(\theta)$ and systematics by **1980Sc16** are given in comments.

[‡] From **1990Ma25** using $\beta\gamma\gamma$ timing, except as noted.

 $\gamma(^{144}\text{Ba})$

Decay scheme is as given by **1980Sc16** based upon the scheme constructed by **1976MoZB**. **1978MoZQ** also assigned the following γ 's to $^{144}\text{Cs} \beta^-$ decay but they were not observed by **1980Sc16**: E_γ (I_γ relative to $I_\gamma(199\gamma)=100$): 273.6 2 (0.7 2), 359.7 3 (0.5 1), 444.1 3 (0.5 1), 1021.5 4 (0.7 2), 1804.4 6 (1.6 3), 1836.8 6 (4.1 5), 2139.5 8 (5.6 6), 2371.1 10 (3.2 5), 2391.3 10 (3.0 5), 2409.5 10 (6.8 8), 2472.2 12 (2.8 5), 2711.0 15 (4.7 8), 2752.8 20 (2.0 5), 3014.6 30 (1.3 4), 3057 3 (2.3 6).

Normalization is not known. **1978MoZQ** state that I_β values given in their reference **1976MoZB** are incorrect since they had neglected the ground-state feeding.

E_γ	I_γ [‡]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [†]	δ [†]	α [@]	Comments
199.326 [#] 5	100.0 13	199.4	2 ⁺	0.0	0 ⁺	E2		0.1751	$\alpha(K)=0.1357$; $\alpha(L)=0.0311$; $\alpha(M)=0.00659$; $\alpha(N+..)=0.00172$ Mult.: $\alpha(K)\text{exp}=0.15$ 2.
^x 210.9 7									
261.0 3	0.70 13	1020.1	0 ⁺	759.0	1 ⁽⁻⁾				
308.23 9	3.10 14	838.4	3 ⁽⁻⁾	530.3	4 ⁺	D(+Q)	+0.06 5		
330.93 5	8.9 2	530.3	4 ⁺	199.4	2 ⁺	E2		0.0333	$\alpha(K)=0.0273$; $\alpha(L)=0.00475$; $\alpha(M)=0.00099$; $\alpha(N+..)=0.00026$ Mult.: E2, M1 from $\alpha(K)\text{exp}=0.036$ 8.

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$^{144}\text{Cs} \beta^-$ decay **1980Sc16** (continued) $\gamma(^{144}\text{Ba})$ (continued)

E_γ	$I_\gamma^\ddagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [†]	$\delta^\dagger$	Comments
348.06 11 ^x 401.4 3	4.0 3	2212.4	(2) ⁺	1864.2	2 ⁺	M1,E2		Mult.: $\alpha(K)_{\text{exp}}=0.021$ 12 (1976MoZB).
477.21 11 ^x 508.76 11 ^x 532.9 8	1.10 13	1315.7	(2)	838.4	3 ⁽⁻⁾	D+Q	+0.23 15	
556.4 3 559.57 5	1.00 21 20.2 5	1315.7 759.0	(2) 1 ⁽⁻⁾	759.0 199.4	1 ⁽⁻⁾ 2 ⁺			
639.00 5 ^x 690.96 2	21.2 4 5	838.4	3 ⁽⁻⁾	199.4	2 ⁺	D(+Q)	-0.005 10 -0.09 2	
758.96 5 785.1 5	20.6 6 0.40 9	759.0 1315.7	1 ⁽⁻⁾ (2)	0.0 530.3	0 ⁺ 4 ⁺			
820.71 7 897.1 4 ^x 990.5 4	5.3 6 0.60 12	1020.1 2212.4	0 ⁺ (2) ⁺	199.4 1315.7	2 ⁺ (2)	Q		
1009.73 13 1025.73 11 ^x 1068.7 9	2.10 24 2.8 3	1848.2 1864.2	2 ⁽⁺⁾ 2 ⁺	838.4 838.4	3 ⁽⁻⁾ 3 ⁽⁻⁾			
1078.63 20 1089.08 15	2.2 3 3.4 4	1837.6 1848.2		759.0 759.0	1 ⁽⁻⁾ 1 ⁽⁻⁾			
1105.3 4 1116.42 10 ^x 1116.9 3 ^x 1122.1 6 ^x 1155.0 6 ^x 1185.4 11 ^x 1196.6 3 ^x 1205.4 6 ^x 1238.67 18 ^x 1245 1 ^x 1276.3 4 ^x 1319.95 12	1.4 3 3.5 4	1864.2 1315.7	2 ⁺ (2)	759.0 199.4	1 ⁽⁻⁾ 2 ⁺	D+Q	+7 +19-3	
1333.9 6 ^x 1351.0 3 1355.3 6 1374.12 12 ^x 1390.6 6 ^x 1444.5 5 1453.46 24 ^x 1475.5 7 ^x 1535.86 23 ^x 1569.37 15 ^x 1587.1 5 1616.7 6 ^x 1627.7 7 ^x 1639.2 5 1649.07 17 1664.98 16 1682.10 22 ^x 1694.1 5 ^x 1730.8 3 ^x 1832.2 3 ^x 1849.8 3 1864.24 24 ^x 1881.9 7 ^x 1940.7 3	0.20 6 0.20 6 3.3 4 2.4 4	1864.2 2375.4 2212.4 2212.4	2 ⁺ (1 ⁺ ,2 ⁺) (2) ⁺ (2) ⁺	530.3 1020.1 838.4 759.0	4 ⁺ 0 ⁺ 3 ⁽⁻⁾ 1 ⁽⁻⁾	D+Q	+1.03 8	
1616.7 6 ^x 1627.7 7 ^x 1639.2 5 1649.07 17 1664.98 16 1682.10 22 ^x 1694.1 5 ^x 1730.8 3 ^x 1832.2 3 ^x 1849.8 3 1864.24 24 ^x 1881.9 7 ^x 1940.7 3	0.60 25	2375.4	(1 ⁺ ,2 ⁺)	759.0	1 ⁽⁻⁾			
1649.07 17 1664.98 16 1682.10 22 ^x 1694.1 5 ^x 1730.8 3 ^x 1832.2 3 ^x 1849.8 3 1864.24 24 ^x 1881.9 7 ^x 1940.7 3	2.2 3 2.8 3 1.50 20	1848.2 1864.2 2212.4	2 ⁽⁺⁾ 2 ⁺ (2) ⁺	199.4 199.4 530.3	2 ⁺ 2 ⁺ 4 ⁺	Q+D Q+D	-3.2 +18-69 -2.8 +11-31	
1649.07 17 1664.98 16 1682.10 22 ^x 1694.1 5 ^x 1730.8 3 ^x 1832.2 3 ^x 1849.8 3 1864.24 24 ^x 1881.9 7 ^x 1940.7 3	1.20 12	1864.2	2 ⁺	0.0	0 ⁺			

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¹⁴⁴ Cs β ⁻ decay 1980Sc16 (continued)								
<u>γ(¹⁴⁴Ba) (continued)</u>								
E _γ	I _γ [‡]	E _i (level)	J _i ^π	E _f	J _f ^π	Mult. [†]	δ [‡]	Comments
^x 1957.3 6								
^x 1971.8 7								
2013.34 22	3.90 17	2212.4	(2) ⁺	199.4	2 ⁺	D(+Q)	+0.04 13	
^x 2055.9 4								
^x 2118.6 3								
^x 2128.5 8								
^x 2141.5 5								
2176.0 3	3.9 5	2375.4	(1 ⁺ ,2 ⁺)	199.4	2 ⁺	D+Q		δ: -0.72 +17-33 if J(2375)=1.
^x 2211.1 4								
^x 2262.9 6								
^x 2267.7 6								
^x 2297.1 7								
^x 2312.9 5								

[†] From Adopted Levels.

[‡] 1980Sc16 do not give intensities for the unplaced γ 's.

From 1979Bo26 cryst.

@ 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.

¹⁴⁴Cs β⁻ decay 1980Sci6

Decay Scheme

Intensities: Type not specified

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$

