

$^{232}\text{Th}(^{136}\text{Xe}, \text{X}\gamma)$ 1999Co02

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Sukhjeet Singh	ENSDF	08-Mar-2022

1999Co02: E=833 MeV. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$ -coin, $\gamma(\theta)$ using GAMMASPHERE array with 73 HPGe detectors at LBNL accelerator facility. Target=36 mg/cm². Deduced levels, J^π , bands.

 ^{224}Ra Levels

E(level) [†]	J^π	Comments
0.0 [‡]	0 ⁺	
84.372 [‡] 3	2 ⁺	
215.985 [#] 4	1 ⁻	
250.9 [‡] 2	4 ⁺	
290.4 [#] 2	3 ⁻	There is negative intensity imbalance at this level, since expected 74-keV transition from this level is not listed by 1999Co02.
432.9 [#] 4	5 ⁻	
479.5 [‡] 3	6 ⁺	
640.6 [#] 4	7 ⁻	
755.6 [‡] 4	8 ⁺	
906.5 [#] 4	9 ⁻	
1069.3 [‡] 4	10 ⁺	
1221.3 [#] 7	11 ⁻	
1414.6 [‡] 7	12 ⁺	
1578.0 [#] 9	(13 ⁻)	
1788.4 [‡] 8	(14 ⁺)	
1969.1 [#] 10	(15 ⁻)	
2188.6 [‡] 10	(16 ⁺)	
2388.5 [#] 11	(17 ⁻)	
2613.0 [‡] 11	(18 ⁺)	
2831.4 [#] 12	(19 ⁻)	
3060.1 [‡] 12	(20 ⁺)	
3294.2 [#] 13	(21 ⁻)	
3527.2 [‡] 13	(22 ⁺)	
3774.0 [#] 14	(23 ⁻)	
4012.3 [‡] 14	(24 ⁺)	
4270.8 [#] 15	(25 ⁻)	
4513.1 [‡] 15	(26 ⁺)	
4782.4 [#] 16	(27 ⁻)	
5031.3 [‡] 16	(28 ⁺)	

[†] From least-squares fit to $E\gamma$ data.

[‡] Band(A): g.s. band.

[#] Band(B): Octupole band.

$^{232}\text{Th}(^{136}\text{Xe}, X\gamma)$ **1999Co02 (continued)**

$\gamma(^{224}\text{Ra})$								
$E_\gamma^\dagger$	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	$\alpha^\#$	Comments
(74.4)		290.4	3 ⁻	215.985	1 ⁻			E_γ : from Adopted Gammas.
84.373 ‡ 3		84.372	2 ⁺	0.0	0 ⁺	E2 ‡	21.2	
131.613 ‡ 4		215.985	1 ⁻	84.372	2 ⁺	E1 ‡	0.247	
142.6 5	39 11	432.9	5 ⁻	290.4	3 ⁻	[E2]	2.15 5	I_γ : $I_\gamma(142.6)/I_\gamma(182.2)=1.39$ 39 is in disagreement with 0.56 13 from Adopted Gammas.
151.2 5		906.5	9 ⁻	755.6	8 ⁺			
160.5 5	15 4	640.6	7 ⁻	479.5	6 ⁺	[E1]	0.1530 25	
166.5 2	100 5	250.9	4 ⁺	84.372	2 ⁺	(E2) ‡	1.162	
182.2 5	28 8	432.9	5 ⁻	250.9	4 ⁺	[E1]	0.1127 18	I_γ : see comment for 142.6 γ .
206.0 2	54 12	290.4	3 ⁻	84.372	2 ⁺	E1 ‡	0.0841	
207.9 5	113 21	640.6	7 ⁻	432.9	5 ⁻	[E2]	0.509 9	
215.983 ‡ 5		215.985	1 ⁻	0.0	0 ⁺	E1 ‡	0.0752	
228.6 2	146 28	479.5	6 ⁺	250.9	4 ⁺	[E2]	0.365	
265.9 2	94 26	906.5	9 ⁻	640.6	7 ⁻	[E2]	0.221	
276.1 2	156 19	755.6	8 ⁺	479.5	6 ⁺	[E2]	0.197	
313.7 2	151 15	1069.3	10 ⁺	755.6	8 ⁺	[E2]	0.1331	
314.8 5	98 22	1221.3	11 ⁻	906.5	9 ⁻	[E2]	0.1317	
345.3 5	121 4	1414.6	12 ⁺	1069.3	10 ⁺	[E2]	0.1008	
356.7 5	83 15	1578.0	(13 ⁻)	1221.3	11 ⁻	[E2]	0.0920	
373.8 5	87 4	1788.4	(14 ⁺)	1414.6	12 ⁺	[E2]	0.0809	
391.1 5	55 14	1969.1	(15 ⁻)	1578.0	(13 ⁻)	[E2]	0.0717	
400.2 5	77 8	2188.6	(16 ⁺)	1788.4	(14 ⁺)	[E2]	0.0674	
419.4 5	37 9	2388.5	(17 ⁻)	1969.1	(15 ⁻)	[E2]	0.0597	
424.4 5	57 8	2613.0	(18 ⁺)	2188.6	(16 ⁺)	[E2]	0.0579	
442.9 5	29 9	2831.4	(19 ⁻)	2388.5	(17 ⁻)	[E2]	0.0520	
447.1 5	31 6	3060.1	(20 ⁺)	2613.0	(18 ⁺)	[E2]	0.0508	
462.8 5	24 7	3294.2	(21 ⁻)	2831.4	(19 ⁻)	[E2]	0.0466	
467.1 5	23 5	3527.2	(22 ⁺)	3060.1	(20 ⁺)	[E2]	0.0456	
479.8 5	21 7	3774.0	(23 ⁻)	3294.2	(21 ⁻)	[E2]	0.0427	
485.1 5	17 5	4012.3	(24 ⁺)	3527.2	(22 ⁺)	[E2]	0.0416	
496.8 5	7 3	4270.8	(25 ⁻)	3774.0	(23 ⁻)	[E2]	0.0393	
500.8 5	4 2	4513.1	(26 ⁺)	4012.3	(24 ⁺)	[E2]	0.0385	
511.6 $^\circ$ 5		4782.4?	(27 ⁻)	4270.8	(25 ⁻)			
518.2 $^\circ$ 5		5031.3?	(28 ⁺)	4513.1	(26 ⁺)			

† Uncertainties of 0.2 and 0.5 keV are assigned by evaluators based on a general statement in caption of Figure 7 in 1999Co02.

‡ From Adopted Gammas.

$^\#$ Theoretical values from BrIcc code with implicit uncertainty of 1.4%, when not stated.

$^\circ$ Placement of transition in the level scheme is uncertain.

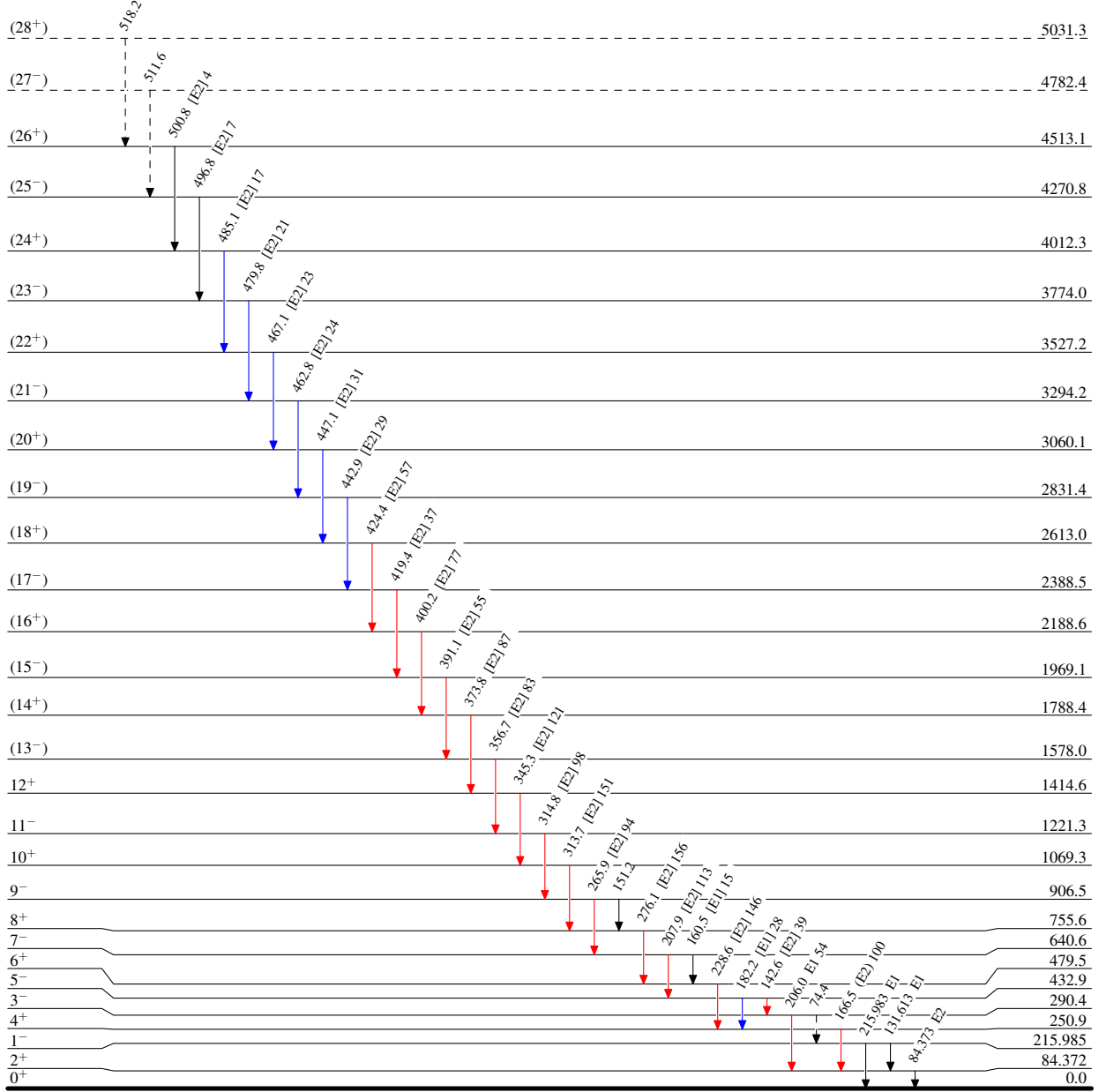
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Legend

Level Scheme

Intensities: Relative I_γ

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

 $^{224}_{88}\text{Ra}_{136}$

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