^{232}Th(^{136}Xe,Xγ) 1999Co02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, M. S. Basunia, Jun Chen et al. ,	NDS 192,315 (2023)	25-Sep-2023

Dataset by Balraj Singh, S. Basunia, and IAEA-ICTP workshop participant: B.M.S. Amro.

1999Co02 (also 1997Co08,1997Co14,1998Bu17,2000BuZY): E(^{136}Xe)=833 MeV, multi-particle transfer reaction. Measured Eγ, Iγ, γγ-coin using Gammasphere array of 73 HPGe detectors at LBNL cyclotron facility. Target was 36 mg/cm^2 thick. Deduced g.s. band and an octupole band.

^{222}Rn Levels

D_0=intrinsic electric dipole moment. Q_0=intrinsic electric quadrupole moment.

E(level)[†]	J^π[‡]	Comments
0.0[#]	0^+	
186.4[#] *2*	2^+	
448.9[#] *3*	4^+	
600.74[@]	1^-	E(level),J^π: from the Adopted Levels. This level is not populated in the present study.
635.0[@] *3*	3^-	
768.5[#] *4*	(6^+)	J^π: 6^+ in Table A.3 of 1999Co02.
797.8[@] *6*	(5^-)	
1049.2[@] *6*	(7^-)	J^π: 7^- in Table A.3 of 1999Co02.
1128.1[#] *4*	(8^+)	J^π: 8^+ in Table A.3 of 1999Co02.
1356.9[@] *6*	(9^-)	J^π: 9^- in Table A.3 of 1999Co02. D_0/Q_0=0.00191 $b_{1/2}$ *35* (1999Co02). Average D_0=0.010 $eb^{1/2}$ *2* (1999Co02) for J=9 and 11 states.
1513.0[#] *5*	(10^+)	J^π: 10^+ in Table A.3 of 1999Co02.
1708.2[@] *6*	(11^-)	J^π: 11^- in Table A.3 of 1999Co02. D_0/Q_0=0.00273 $b_{1/2}$ *63* (1999Co02). Average D_0=0.010 $eb^{1/2}$ *2* (1999Co02) for J=9 and 11 states.
1913.4?[#] *6*	(12^+)	
2089.1[@] *8*	(13^-)	
2317.2?[#] *8*	(14^+)	
2485.3?[@] *8*	(15^-)	
2727.7?[#] *9*	(16^+)	
2881.9?[@] *10*	(17^-)	
3285.9?[@] *11*	(19^-)	
3696.1?[@] *12*	(21^-)	

[†] From least-squares fit to Eγ data.

[‡] As assigned in level-scheme Fig. 7 in 1999Co02, based on proposed band structures. Note that definite J^π assignments are listed in authors′ Table A.3.

[#] Band(A): g.s. band.

[@] Band(B): Octupole vibrational band.

^{232}Th(^{136}Xe,Xγ) 1999Co02 (continued)

γ(^{222}Rn)

E_γ[†]	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[#]	Comments
163.0[@] *5*		797.8	(5⁻)	635.0	3⁻			
175.6[@] *5*		2089.1	(13⁻)	1913.4?	(12⁺)			
186.4 *2*	100 *15*	186.4	2⁺	0.0	0⁺	E2	0.675 *10*	Mult.: from the Adopted Gammas.
195.4 *5*	22 *14*	1708.2	(11⁻)	1513.0	(10⁺)	[E1]	0.0910 *14*	Mult.: E1 in 1999Co02.
228.8 *5*	23 *13*	1356.9	(9⁻)	1128.1	(8⁺)	[E1]	0.0624 *9*	Mult.: E1 in 1999Co02.
251.4[@] *5*		1049.2	(7⁻)	797.8	(5⁻)			
262.5 *2*	134 *20*	448.9	4⁺	186.4	2⁺	[E2]	0.2087 *30*	Mult.: E2 in 1999Co02.
280.6 *5*	25 *7*	1049.2	(7⁻)	768.5	(6⁺)	[E1]	0.0387 *6*	Mult.: E1 in 1999Co02.
307.7 *5*	31 *13*	1356.9	(9⁻)	1049.2	(7⁻)	[E2]	0.1279 *19*	Mult.: E2 in 1999Co02.
319.6 *2*	118 *26*	768.5	(6⁺)	448.9	4⁺	[E2]	0.1144 *16*	Mult.: E2 in 1999Co02.
348.9[@] *5*		797.8	(5⁻)	448.9	4⁺			
351.2 *5*	46 *14*	1708.2	(11⁻)	1356.9	(9⁻)	[E2]	0.0874 *13*	Mult.: E2 in 1999Co02.
359.6 *2*	75 *14*	1128.1	(8⁺)	768.5	(6⁺)	[E2]	0.0819 *12*	Mult.: E2 in 1999Co02.
380.9 *5*	15 *8*	2089.1	(13⁻)	1708.2	(11⁻)	[E2]	0.0700 *10*	Mult.: E2 in 1999Co02.
384.9 *2*	40 *11*	1513.0	(10⁺)	1128.1	(8⁺)	[E2]	0.0680 *10*	Mult.: E2 in 1999Co02.
396.3[@] *5*		2485.3?	(15⁻)	2089.1	(13⁻)			
396.6[@] *5*		2881.9?	(17⁻)	2485.3?	(15⁻)			
400.4[@] *5*		1913.4?	(12⁺)	1513.0	(10⁺)			
403.8[@] *5*		2317.2?	(14⁺)	1913.4?	(12⁺)			
404.0[@] *5*		3285.9?	(19⁻)	2881.9?	(17⁻)			
410.2[@] *5*		3696.1?	(21⁻)	3285.9?	(19⁻)			
410.5[@] *5*		2727.7?	(16⁺)	2317.2?	(14⁺)			
448.6[@] *5*		635.0	3⁻	186.4	2⁺	[E1]	0.0163 *2*	

[†] From 1999Co02. Energy uncertainty is stated as 0.2 keV for transitions from low-lying positive-parity levels and 0.5 keV for higher-lying levels, as well as for transitions from the negative-parity levels. Evaluators assign 0.2 keV for transitions from positive-parity levels up to (10⁺), and 0.5 keV for all the others.

[‡] 1999Co02 assign definite multipolarities for transitions from levels up to (11⁻), but no supporting data are available, thus the evaluators treat these as assumed assignments based on band assignments.

[#] 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.

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

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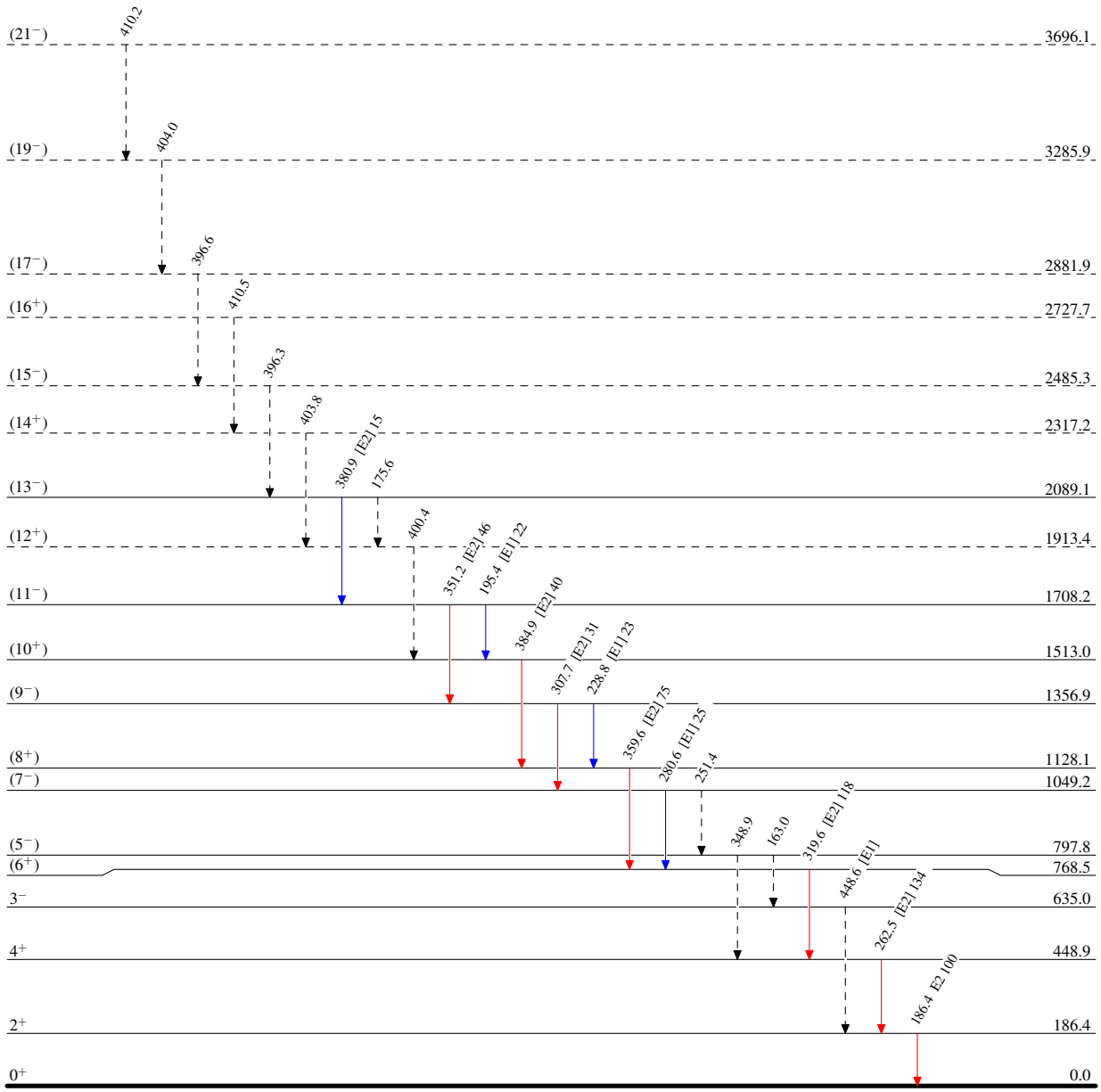
Level Scheme

Intensities: Relative I_γ

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)



$^{222}_{86}Rn_{136}$

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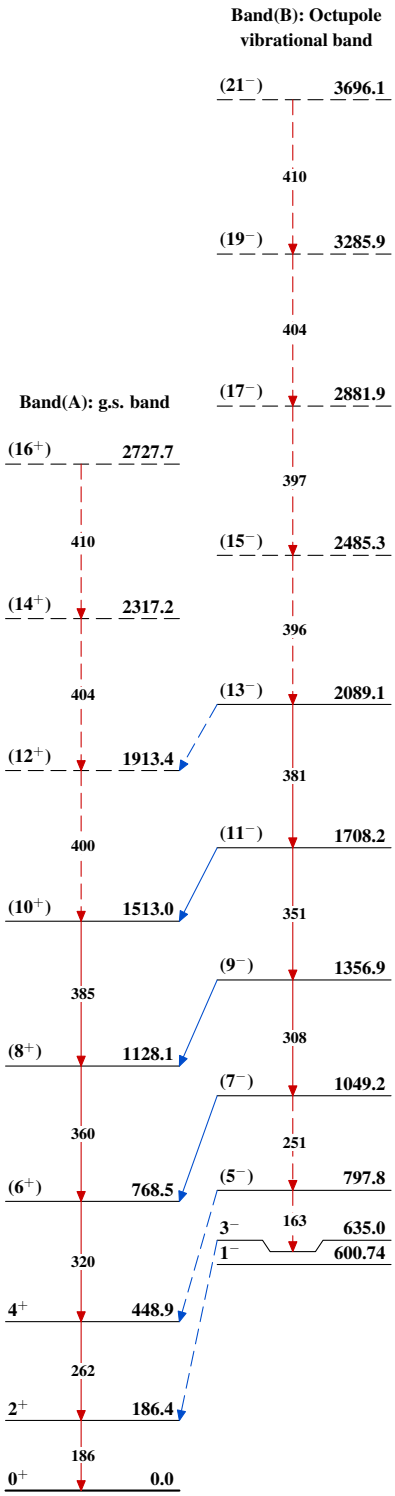

$^{222}_{86}Rn_{136}$