^{170}Yb(^{28}Si,4nγ) 1999He32,1995Yo02,2006Gr16

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 177, 1 (2021)	3-Sep-2021

Includes ^{171}Yb(^{28}Si,5nγ) from 1999He32, and ^{114}Cd(^{83}Kr,3nγ) from 2006Gr16, 2008Gr04.

1999He32 (also 2002Ju12, 2001Ju09,1997Ju03): E=143 MeV for ^{170}Yb target and 155 MeV for ^{171}Yb target. Measured Eγ, $\gamma\gamma$-coin, Iγ, $\gamma(\theta)$ using DORIS array of nine TESSA type detectors, the Jurosphere array of ten TESSA type detectors and 13 Eurogam phase I type detectors, and RITU gas-filled recoil separator. Recoil-decay tagging (RDT) technique used by detecting α particles from the decay of ^{194}Po.

1995Yo02: ^{170}Yb(^{28}Si,4nγ) E=142 MeV. Measured Eγ, (recoil)γ-coin, and $\gamma\gamma$-coin using a fragment mass analyzer and an array of ten Compton suppressed Ge detectors. Ground-state band up to 10^+, and three other levels were proposed in this study.

2006Gr16, 2008Gr04: E=375 MeV. Measured Eγ, $\gamma\gamma$-coin, $\alpha\gamma$ coin, lifetimes. Gamma rays detected using 15 JUROGAM Ge detectors. Recoil decay tagging (RDT) used to tag γ-ray spectra with ^{194}Po α decay. Average lifetimes extracted from decay curves measured by detector rings at 158° and 134°. The separated recoils were detected at the RITU (gas-filled separator) focal plane by the GREAT particle spectrometer. The results are the same in 2006Gr16 and 2008Gr04, but the details of the measurements are given by 2008Gr04.

Q_t=transition quadrupole moment deduced from lifetime data (2008Gr04).

The level scheme and $\gamma(\theta)$ data are from 1999He32.

^{194}Po Levels

E(level)	J$^\pi$[†]	$T_{1/2}$[‡]	Comments
0.0[#]	0^+		
319.8[#] *3*	2^+	26 ps *5*	Q_t=5.5 *6*, β_2^t=0.18 *2* (2008Gr04).
686.5[#] *4*	4^+	9.7 ps *28*	Q_t=5.4 *8*, β_2^t=0.17 *3* (2008Gr04).
757.8[@] *4*	2^+		
1148.3[#] *5*	6^+		
1211.3[@] *5*	4^+		
1645.2[@] *6*	6^+		
1693.5[#] *6*	8^+		
1986.0[&] *6*	7^-		
2066.6 *7*	(8^+)		
2283.7[&] *7*	9^-		
2295.3[#] *7*	10^+		
2525.2? *8*	(11^-)	15 μs *2*	E(level): this tentative level is not confirmed in the delayed-γ study by 2016An10 from an isomer in ^{194}Po. Instead a 12.9−μs isomer is assigned by 2016An10 to a 2313 level decaying by a 248γ. The 2525 level is not included in the Adopted dataset, and the 15 μs is considered the same as the 12.9−μs isomer. $T_{1/2}$: from (recoil)γ(t) (1999He32).
2624.5[#] *7*	12^+		J$^\pi$: 11^- assigned by 1995Yo02.
2655.6?[&] *9*	(10)		
2916.6[#] *8*	(14^+)		
3326.5?[#] *9*	(16^+)		

[†] As proposed by 1999He32 based on $\gamma(\theta)$ data and systematics of heavier Po nuclides. When considered in Adopted Levels, assignments are placed inside parentheses if there is no other supporting evidence.

[‡] From recoil-decay tagging technique in recoil-distance Doppler-shift (RDDS) measurements. Analysis by differential-decay curve method (DDCM) (2006Gr16,2008Gr04).

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

[@] Band(B): Band based on 2^+.

[&] Seq.(C): γ sequence based on 7^-.

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$\gamma(^{194}Po)$

For stretched quadrupole transitions, I(143°)/I(90°)=1.20 *8* (1999He32).

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Comments
292.1 *3*	5.1 *7*	2916.6	(14^+)	2624.5	12^+		
297.7 *3*	5.6 *9*	2283.7	9^-	1986.0	7^-	(E2)	Mult.: I(143°)/I(90°)=1.5 *4* gives ΔJ=2.
319.7 *3*	100 *8*	319.8	2^+	0.0	0^+	E2	B(E2)(W.u.)=90 *20* (2008Gr04) Mult.: I(143°)/I(90°)=1.22 *5*. E_γ: other: 318.6 *2* (1995Yo02).
329.2 *3*	7.3 *10*	2624.5	12^+	2295.3	10^+	(E2)	E_γ: other: 329.2 *3* (1995Yo02). Mult.: I(143°)/I(90°)=1.3 *3* gives ΔJ=2.
340.8 *3*	7.5 *12*	1986.0	7^-	1645.2	6^+	(D)	E_γ: other: 340.3 *3* (1995Yo02) placed from a 659 level to 320 level. Mult.: I(143°)/I(90°)=0.92 *13*.
[x]359.2 *5*	6 *2*						I(143°)/I(90°)=0.7 *2*.
366.5 *3*	66 *7*	686.5	4^+	319.8	2^+	E2	B(E2)(W.u.)=120 *40* (2008Gr04) E_γ: other: 365.7 *2* (1995Yo02). Mult.: I(143°)/I(90°)=1.24 *7*.
371.9[@] *5*	2.8 *6*	2655.6?	(10)	2283.7	9^-	(D)	Mult.: I(143°)/I(90°)=0.9 *3*.
373.1[‡] *5*		2066.6	(8^+)	1693.5	8^+		
409.9[@] *5*	1.4 *5*	3326.5?	(16^+)	2916.6	(14^+)		
433.9 *5*	4.9 *12*	1645.2	6^+	1211.3	4^+		I(143°)/I(90°)=1.2 *6*.
438.1 *5*	6 *2*	757.8	2^+	319.8	2^+		I(143°)/I(90°)=1.0 *2*.
453.9 *5*	3.9 *11*	1211.3	4^+	757.8	2^+	(E2)	Mult.: I(143°)/I(90°)=1.09 *10* gives ΔJ=2.
458.6[‡@] *5*		2525.2?	(11^-)	2066.6	(8^+)	[E3]	
461.8 *3*	43 *5*	1148.3	6^+	686.5	4^+	(E2)	E_γ: other: 461.0 *3* (1995Yo02). Mult.: I(143°)/I(90°)=1.30 *10* gives ΔJ=2.
524.4 *5*	5.1 *12*	1211.3	4^+	686.5	4^+		E_γ: other: 525.1 *4* (1995Yo02). I(143°)/I(90°)=0.8 *3*.
545.2 *3*	29 *3*	1693.5	8^+	1148.3	6^+	(E2)	E_γ: other: 544.6 *3* (1995Yo02). Mult.: I(143°)/I(90°)=1.18 *11* gives ΔJ=2.
601.8 *3*	17 *2*	2295.3	10^+	1693.5	8^+	(E2)	E_γ: other: 600.7 *4* (1995Yo02). Mult.: I(143°)/I(90°)=1.3 *3* gives ΔJ=2.
758.1 *5*	7 *5*	757.8	2^+	0.0	0^+	(E2)	Mult.: I(143°)/I(90°)=1.1 *3*.
[x]802.7 *5*	2 *1*						I(143°)/I(90°)=0.9 *4*.
918.3[‡] *5*		2066.6	(8^+)	1148.3	6^+		
958.7 *5*	1.8 *7*	1645.2	6^+	686.5	4^+		

[†] From 1999He32. Corresponding values from 1995Yo02 are in agreement, but generally seem to be lower by up to 1 keV.

[‡] γ identified in recoil-decay tagging (RDT) method for delayed γ rays observed in the RITU focal plane, tentatively assigned to the decay of an isomer.

[#] Assigned by evaluators based on $\gamma(\theta)$ data in 1999He32, and RUL (for E2 and M2) for γ rays from levels of known half-life, and assuming half-lives of no longer than few ns for other levels for in-band transitions.

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

[x] γ ray not placed in level scheme.

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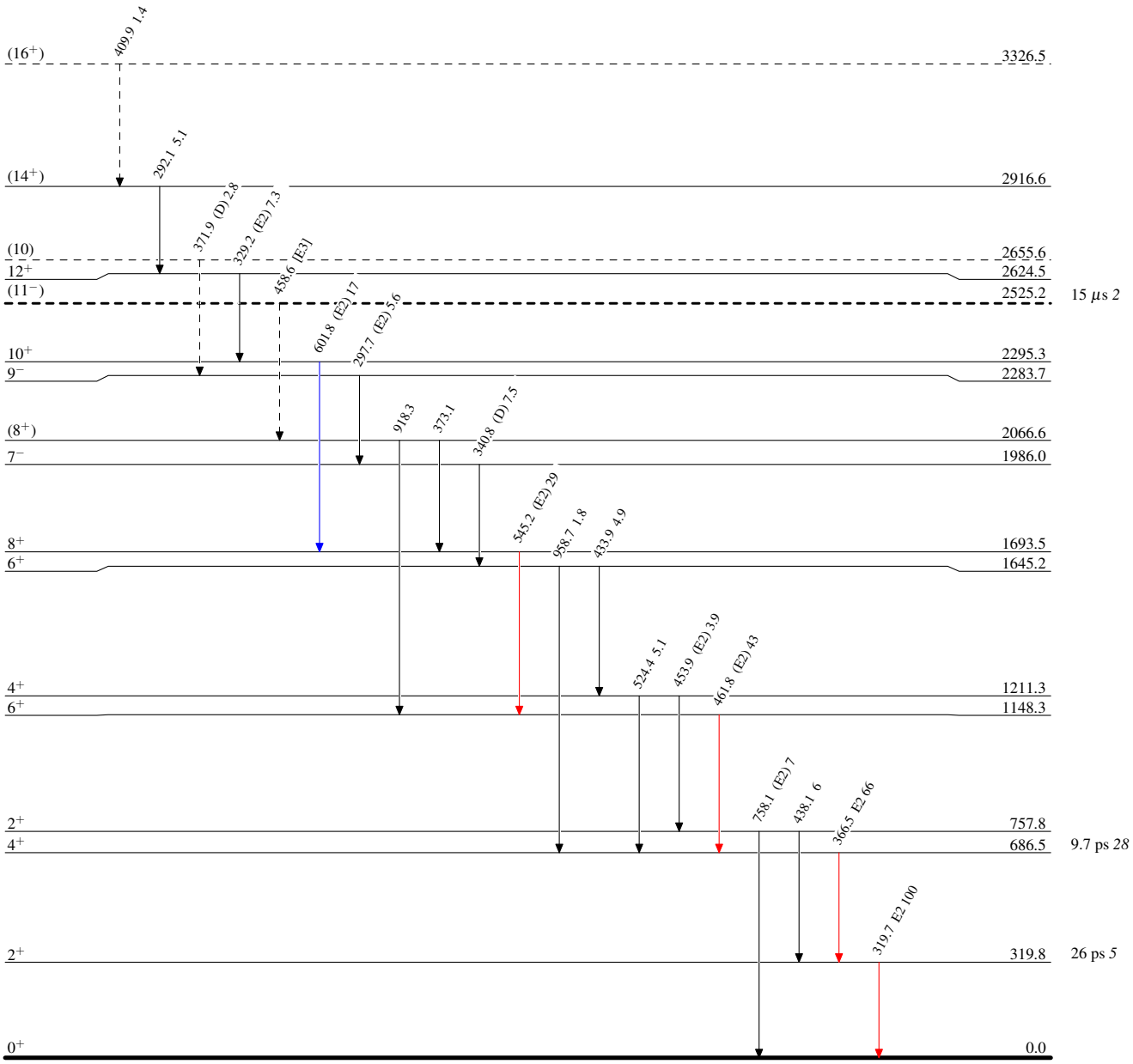
Level Scheme

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)



$^{194}_{84}Po_{110}$

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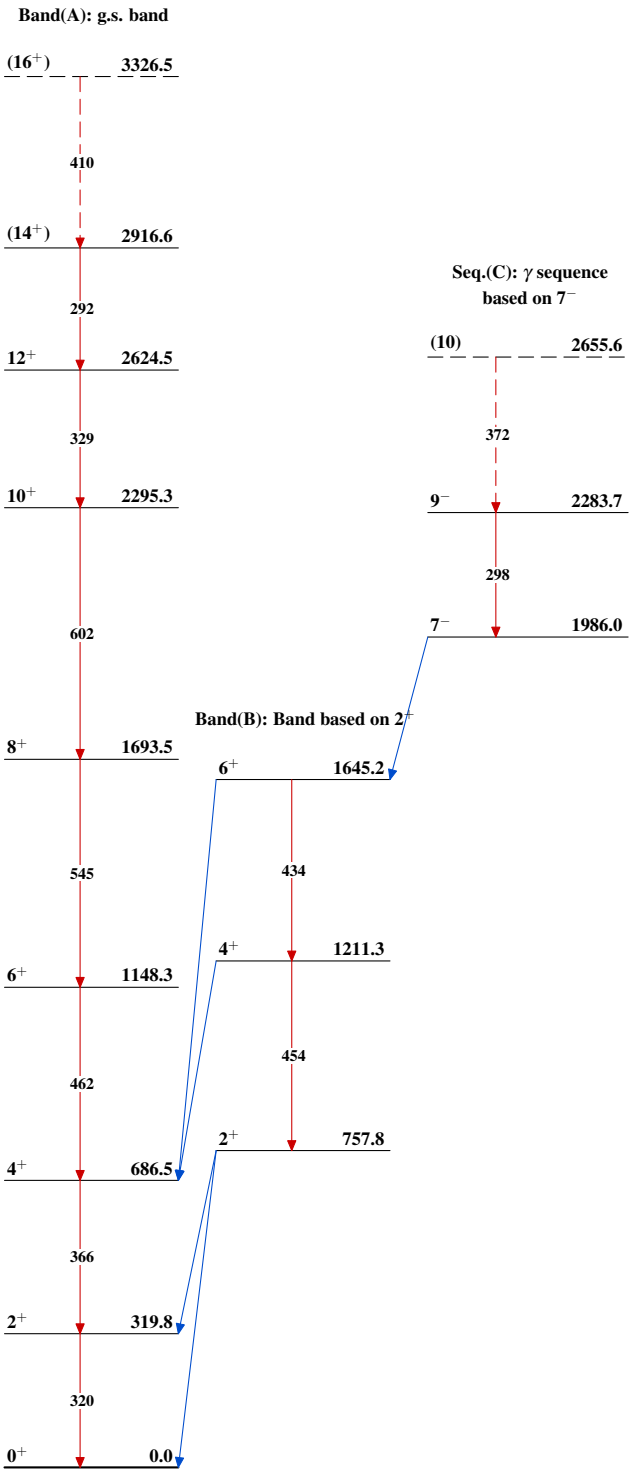

$^{194}_{84}Po_{110}$