^{208}Pb(^{7}Li,α2nγ) 1972Ha59,1978Be17

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. Chen # and F. G. Kondev	NDS 126, 373 (2015)	30-Sep-2013

1972Ha59: E=28-31.5 MeV ^{7}Li beam was produced from the Chalk River MP tandem accelerator. Target was 10 mg/cm^2 thick ^{208}Pb. γ-rays were detected in a 45 cm^3 Ge(Li) counters and back-scattered particles were detected by an annular detector. Measured Eγ, $\alpha\gamma$-coin, Doppler-shift attenuation. Deduced levels, transition probabilities, $T_{1/2}$. Data reported here were taken at 31.5 MeV.

1978Be17: E=32-44 MeV ^{7}Li beam was produced from the Chalk River MP tandem accelerator. γ-rays were detected by two Ge(Li) detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin, γ(t). Deduced levels, J^π, branchings, mixing ratios, $T_{1/2}$. Data reported here were taken at 36 MeV.

^{209}Bi Levels

E(level)†	J^π†	$T_{1/2}$‡	Comments
0.0	$9/2^-$		configuration=$\pi(1h_{9/2})^{+1}$.
897	$7/2^-$		configuration=$\pi(2f_{7/2})^{+1}$.
1609	$13/2^+$		configuration=$\pi(1i_{13/2})^{+1}$.
2444	$1/2^+$	>2 ps	J^π: from Adopted Levels. $T_{1/2}$: from 1547γ(t) assigned to 3156 level by 1972Ha59. See comment on 1547γ.
2493	$3/2^+$	>2 ps	
2563	$9/2^+$	0.014 ps *11*	
2584	$7/2^+$	0.31 ps *10*	
2600	$13/2^+$	0.44 ps *14*	
2617	$5/2^+$	>2 ps	
2741	$15/2^+$	>2 ps	$T_{1/2}$: other: 7 ps *+4−2* from B(E3)↓(2741γ)=0.065 *20* in 1978Be17.
2826	$5/2^-$	<0.014 ps	configuration=$\pi(2f_{5/2})^{+1}$.
2986	$19/2^+$	18 ns *1*	g=0.368 *8* E(level),J^π: from 1978Be17. $T_{1/2}$: weighted average of values from 245γ(t), 1133γ(t), 2741γ(t), 992γ(t) and 1608γ(t) (1978Be17). g: from $\gamma(\theta$,H,t) (1978Be17).
3120	$3/2^-$	0.021 ps *14*	configuration=$\pi(3p_{3/2})^{+1}$.

† From 1972Ha59, unless otherwise noted.
‡ From 1972Ha59 by Doppler-shift attenuation method (DSAM), unless otherwise noted.

γ(^{209}Bi)

E_i(level)	J_i^π	E_γ†	I_γ‡	E_f	J_f^π	Mult.#	δ#	α@	Comments
897	$7/2^-$	897	100	0.0	$9/2^-$				
1609	$13/2^+$	1609	100	0.0	$9/2^-$	M2+E3	+0.33 *10*	0.0127 *5*	Mult.: A_2=+0.47 *2* (1978Be17). δ: alternate solution of +2.2 *8* is ruled out since $T_{1/2}$(1609γ) deduced from B(E3) with this δ is inconsistent with the spin-rotation pattern of the 1609γ (1978Be17).
2444	$1/2^+$	1547	>80	897	$7/2^-$				E_γ: assigned by 1972Ha59 as deexciting a level at 3156. Reassigned by the evaluator as deexciting the 2444 level as determined in (t,2nγ).
2493	$3/2^+$	2493	>95	0.0	$9/2^-$				
2563	$9/2^+$	2563	>95	0.0	$9/2^-$				
2584	$7/2^+$	1687	68	897	$7/2^-$				
		2584	32	0.0	$9/2^-$				

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^{208}Pb(^{7}Li,α2nγ) 1972Ha59,1978Be17 (continued)

γ(^{209}Bi) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[@]	$I_{(\gamma+ce)}$	Comments
2600	$13/2^+$	992		1609	$13/2^+$	M1(+E2)	−0.04 *4*	0.0196		Mult.: A_2=+0.27 *4* (1978Be17). δ: alternate solution (+0.63 *7*) is ruled out by 1978Be17 based on a comparison of the experimental B(E2) for each δ solution with the value from a weak-coupling calculation.
2617	$5/2^+$	1720	60	897	$7/2^-$					
		2617	40	0.0	$9/2^-$					
2741	$15/2^+$	140.13		2600	$13/2^+$				26 *2*	E_γ: from Adopted Gammas. Not seen directly in (^{7}Li,α2nγ) but presence deduced from $\gamma\gamma$ (1978Be17). $I_{(\gamma+ce)}$: from intensity balance at 2600 level in delayed spectrum, I(γ+ce)=48 *2* relative to Iγ(1133+2741γ's)=135 *6* (1978Be17). I_γ: from I(γ+ce) and α one gets Iγ=9.6 *4* for mult=E2 and 5.1 *3* for mult=M1.
		1133	30 *2*	1609	$13/2^+$	M1+E2	+0.14 *4*	0.0138		Mult.,δ: A_2=−0.01 *5*, A_4=−0.02 *3* (1978Be17).
		2741	44 *4*	0.0	$9/2^-$	E3		0.00243		Mult.: A_2=+0.42 *3* (1978Be17).
2826	$5/2^-$	1930	40	897	$7/2^-$					
		2826	60	0.0	$9/2^-$					
2986	$19/2^+$	245	100	2741	$15/2^+$	E2		0.226		Mult.: A_2=+0.26 *3* (1978Be17).
		384	<1	2600	$13/2^+$					E_γ: from level energy difference. I_γ: transition not seen. Limit is from 1978Be17.
3120	$3/2^-$	2224	>95	897	$7/2^-$					

[†] From 1972Ha59, except for the transitions from the 2986 level which are taken from 1978Be17.
[‡] From 1972Ha59, except for those for the 2741 and 2986 levels which are from 1978Be17.
[#] From 1978Be17, based on $\gamma(\theta)$.
[@] 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.

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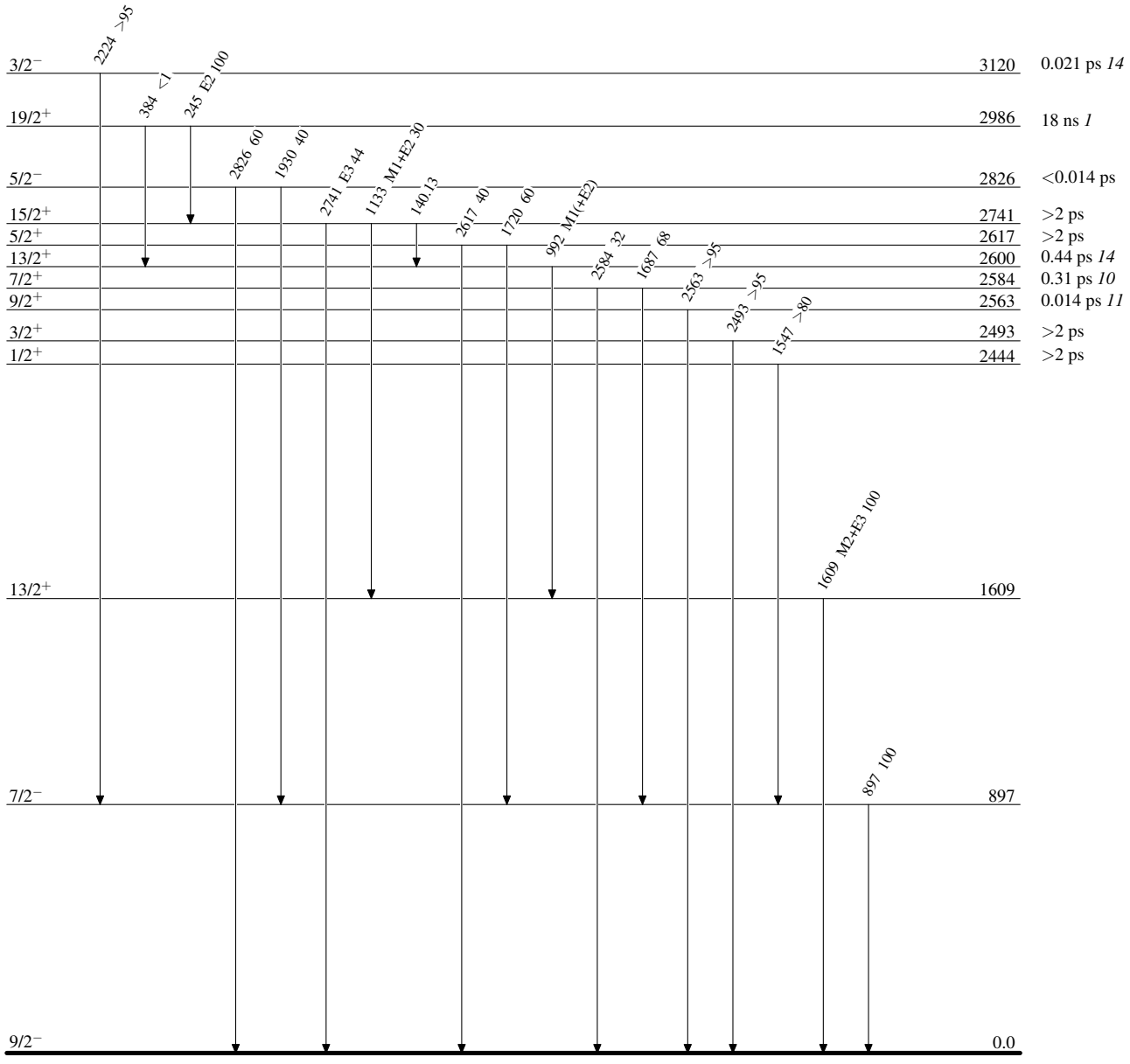
Level Scheme

Intensities: % photon branching from each level



$^{209}_{83}Bi_{126}$