$^{208}\text{Pb}(\alpha,\text{d})$ 1977Da05,1981Da07,1988La18

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 121, 561 (2014)	31-Mar-2014

Others: 1987Sh13, 1984Sa04, 1983Sa33, 1982Na22, 1979Wu09, 1978Da12, 1978Wu02.

Preferential (α,d) excitations are J(max)=J(p) + J(n) for the dominant p-n configuration. Related high-spin states populated by (α,d) in ^{208}Bi,^{206}Bi show similar E(level) spacings, angular distribution shapes, and strengths (1977Da05).

1977Da05, 1981Da07:>99% enriched ^{208}Pb target. Projectile: α's, E=33, 48 MeV. Measured scattered deuterons at θ=10° to 60° in 10° steps (ED=33 MeV), and at θ=10° to 40° in 5° steps (ED=48 MeV). Detector: magnetic spectrograph (Q3D), FWHM(33 MeV)=16 keV, FWHM(48 MeV)=25 keV.

1988La18: projectiles: α's, E=218 MeV. Measured scattered deuterons at θ=3° to 18°. Detector: magnetic spectrograph, FWHM≈220 keV. Deduced spins and configurations by comparing experimental angular distributions with theoretical DWBA values.

^{210}Bi Levels

E(level)[e]	L[c]	$\sigma(\mu\text{b/sr})$[d]	Comments
0[†a]	(1)	2.2	
49[†a]	(1)	3.4	
270[†ab]	(9)	85	J(max)=9$^-$. L=9 analogs: ^{208}Bi,^{206}Bi at 2477,2542 keV, respectively.
319[†a]	(3)	8.8	
350[†a]	(3)	3.4	
435[†a]	(7)	47	Doublet of 433,439 states.
501[†a]	(5)	14.8	
548[†a]	(5+7)	25	
581[†a]	(7)	100	
669[‡ab]	11	38	J$^\pi$=10$^-$ (J(max)=10$^-$). L=11 analogs: ^{208}Bi,^{206}Bi at 2.81,2.86 MeV, respectively.
915[a]	7	260	J(max)=8$^-$. L=7 analogs: ^{208}Bi,^{206}Bi at 3096,3170 keV, respectively. Configuration=$((\pi\ 2f_{7/2})(\nu\ 2g_{9/2}))$ is dominant; see (pol d,p).
994[a]	(3)	23	Doublet of 972,994 states.
1180[‡] 2	(7,8,9)	35	
1205 2	(6,7,8,9)	117	
1244 2	(5)	24	
1316[b] 3	(10)	318	J$^\pi$=11$^+$ (J(max)=11$^+$), Configuration=$((\pi\ 1i_{13/2})(\nu\ 2g_{9/2}))$ (1988La18 1981Da07). L=10 analogs: ^{208}Bi,^{206}Bi at 3508,3568 keV, respectively.
1373[‡] 3	(≤9)	(12)	Doublet of 1374,1382 states.
1469[#] 3	(12)	30	J(max)=12$^+$. L=12 analogs: ^{208}Bi,^{206}Bi at 3609,3632 keV, respectively.
1520[‡] 3	(5,6)	10	
1579 3		8.8	
1704 3	(5)	18.4	L=5 (α,d) conflicts with L=7 (d,p),$(\alpha,^3\text{He})$.
1751[#] 4		144	
1808[#] 4	(11,10)	58	Doublet of 1801, 1812 states.
1840[#] 4		(28)	
1908 4		(14)	
1987 4	(12)	65	J=(11$^+$,12$^+$) inferred from L-value and cross section.
2034[@] 4		(13.4)	
2101 4	(12)	(44)	(11$^+$), 2110-keV excitation in $(\alpha,^3\text{He})$ probably corresponds.
2143 4	(11,10)	(107)	

Continued on next page (footnotes at end of table)

^{208}Pb(α,d)   **1977Da05,1981Da07,1988La18 (continued)**

<u>^{210}Bi Levels (continued)</u>

E(level)[e]	L[c]	σ(μb/sr)[d]	Comments
2174? 4		(20)	
2231 5		(14)	
2280 5	(7,9)	(31)	
2468 5		18	
2523?		<(10)	
2543 5		19	
2581[&] 5	5	65	J(max)=5$^-$.
2614 5	(5)	33	
2664 5	(5)	19	
2733[b] 5	(13)	134	Doublet of 2733,2736 states.
			J$^\pi$=14$^-$ (J(max)=14$^-$), Configuration=((π 1i$_{13/2}$)(ν 1j$_{15/2}$)). (1988La18,1981Da07).
			L=13 analogs: ^{208}Bi,^{206}Bi at 4848,4843 keV, respectively.
2773 5		(32)	
2833[b] 6	(10,11)	52	
2868 6		20.5	
2924 6		23	
3042 6		32	
3086?		(15)	
3123 6	(5)	27	Doublet of 3107,3141 states.
3208 6		88	
3239 6	(10,11)	38	
3332 7	(12)	71	
3412[b] 7	(11,12)	73	
3443 7		32	
3502 7		66	
3538 7		48	
4025?		(50)	
4188		(70)	

[†] Configuration=((π 1h$_{9/2}$)(ν 2g$_{9/2}$)).

[‡] Main Configuration=((π 1h$_{9/2}$)(ν 1i$_{11/2}$)).

[#] Main Configuration=((π 1h$_{9/2}$)(ν 1j$_{15/2}$)).

[@] Main Configuration=((π 1h$_{9/2}$)(ν 3d$_{5/2}$)).

[&] Main Configuration=((π 1h$_{9/2}$)(ν 4s$_{1/2}$)).

[a] Nominal energies used for calibration.

[b] Observed also by 1988La18 using 218-MeV α's.

[c] Deduced by 1981Da07 from angular distributions compared with standard shapes and DWBA values. L-uncertainty=1 (for low values of L), 2 (for high values of L).

[d] σ(μb/sr) for E=48 MeV (θ=10°), measured by 1981Da07.

[e] From 1977Da05, 1981Da07. Uncertainties for E>1 MeV are based on a general fractional uncertainty of 0.2% suggested by 1977Da05.