^{209}Bi(p,d) 1973Cr05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin	NDS 108,1583 (2007)	1-Jun-2007

E=35 MeV, FWHM<5 keV.

The authors point out that the (p,d) reaction on ^{209}Bi is expected to populate states with configuration=$\pi 1h_{9/2}\nu(nlj)^{-1}$J. expected hole states are $3p_{1/2}$, $2f_{5/2}$, $3p_{3/2}$, $1i_{13/2}$, $2f_{7/2}$, and $1h_{9/2}$. All the states expected on the basis of this multiplet interpretation have been observed, with the possible exception of the 2^- member of the $\pi 1h_{9/2}+n1i^{-1}_{13/2}$ multiplet. The authors point out that they see No evidence for this state At 2716 as reported In ^{209}Bi(d,t). The 2901 level appears to have L=6; however, its small strength suggests that, even if $J^\pi=2^-$, the 2^- strength is fractionated. In (p,nγ), 1985RoZT suggest that this 2^- state is At 2893, agreeing with the suggestion of 1973Cr05. The L=(0) angular distribution for the 3335 and 3355 peaks suggests that the $3s_{1/2}$ hole state is also being populated, but the cross section ratio implies that the $\pi 1h_{9/2}\nu 3s^{-1}_{1/2}$ states are fragmented.

^{208}Bi Levels

$J^\pi(^{209}Bi)=9/2^-$.

E(level)[@]	J^π[e]	L[†]	S[‡]	Comments
0.0	5^+	1	1.05	
63.4 *7*	4^+	1	0.87	
511.4 *8*	6^+	3	1.33	
603.0 *8*	4^+	3	0.93	
631.8[#] *8*	$5^+,3^+$	3	1.89	
652.3 *8*	7^+	3	1.52	
888.6 *8*	5^+	1	1.02	
927.3[b] *9*	2^+	3	0.48	
961.2 *9*	4^+	1	0.73	
1035.6 *15*				
1071.2 *15*	3^+	1	0.60	
1097.4 *15*	6^+	1	1.19	
1533.5 *15*				
1575.6 *15*	10^-	6	2.24	
1628.8 *15*				
1664.1 *16*	8^-	6	2.05	
1708.2 *16*	5^-	6	1.22	
1720.6[c] *16*	$6^-,7^-$	6	2.56	
1791.5 *15*	9^-	6	1.95	
1843.9 *15*	4^-	6	0.92	
1875.7 *15*		1	≈0.02	
1924.7 *16*	3^-	6	0.70	
2345.9 *22*	7^+	3	1.49	
2391.2[d] *22*	$4^+,5^+$	3	1.89	J^π: a 4^+, 5^+ doublet is confirmed In Adopted Levels.
2414.9 *22*	6^+	3	1.29	
2434.2 *23*	11^-	6	2.50	
2463.5 *22*	3^+	3	0.72	
2507.7 *22*	2^+	3	0.46	
2667.5 *22*	8^+	3	1.54	
2727.0 *23*				
2891.6 *23*	1^+	3	0.35	
2900.6	(2^-)[f]	(6)	0.23	
3057 *3*				
3079 *3*				
3122 *3*		1		
3149 *3*		1		

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^{209}Bi(p,d) 1973Cr05 (continued)

^{208}Bi Levels (continued)

E(level)[@]	L[†]	S[‡]	E(level)[@]	L[†]	S[‡]	E(level)[@]	L[†]
3220 *3*			3473 *3*	5(+3)[a]	1.28[&]	3776 *3*	
3248 *3*			3533 *3*	5(+3)[a]	0.59[&]	3896 *3*	(5)
3281 *3*	3+5[a]	0.33[&]	3550 *3*	5(+3)[a]	0.30[&]	4025 *4*	3
3326 *3*			3574 *3*	5	1.79	4194 *4*	
3335 *3*	0		3620 *3*			4555 *4*	3
3355 *3*	0		3671 *3*			4568 *4*	1
3371 *3*	3+5[a]	0.57[&]	3697 *3*			4599 *4*	1
3396 *3*			3732 *3*			4629 *4*	3
3421 *3*	5(+3)[a]	1.81[&]	3751 *3*				

[†] From DWBA.

[‡] For each L, values are based on a comparison of σ with that for the corresponding single-hole state In ^{208}Pb(p,d). For L=1, the g.s. and 64 level are assumed to exhaust the $p_{1/2}$ strength. The other L=1 states are assumed to Be $p_{3/2}$ (1973Cr05). For L=3, the group of states At 511-927 are interpreted As $2f_{5/2}$, those At 2346-2892 as $2f_{7/2}$.

[#] Doublet based on peak strength and broadening. The separation of the two peaks is≤4.5 keV. A doublet with $J^{\pi}=3^+$ and 5^+ is confirmed In Adopted Levels.

[@] From a comparison with energies from (p,nγ), the energies In (α,d) above 500 keV show a deviation of +1.2 At 500 keV increasing linearly to +7.6 keV At 3 MeV. Where used In Adopted Levels, and for correlation with levels reported In other reactions, the evaluator has lowered the authors′ values using the relation E(corrected)=0.99747E(authors).

[&] S-value corresponds to L=5 component In the peak.

[a] $\sigma(\theta)$ indicates some L=3 contribution.

[b] There is some evidence for the presence of the 939 level observed In ^{207}Pb(^{3}He,d), but it is not clearly resolved from the 927 level.

[c] Doublet based on strength. No broadening is observed so the two states are <3 keV apart.

[d] Doublet based on strength.

[e] From authors based on their assumption that, within each multiplet, level strength is proportional to 2J+1.

[f] Assignment is tentative. The level is weak and is just resolved from the 2892 level. The authors point out that the limited angular distribution is suggestive of L=6; however, the small strength suggests that either the 2^- strength is fragmented or the assignment is incorrect.