

<sup>209</sup>Bi(d,t),(<sup>3</sup>He,α) 1971A105

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

E(d)=20 MeV, FWHM=12, θ=10°-80°.

E(<sup>3</sup>He)=28 MeV, FWHM≈20, θ=40°,60°.

Others: 1964Er06.

J<sup>π</sup>(<sup>209</sup>Bi)=9/2<sup>-</sup>.

As pointed out by the authors, the <sup>209</sup>Bi(d,t) reaction is expected to populate levels with configuration=π1h<sub>9/2</sub>ν(nlj)<sup>-1</sup>J with neutron hole states 3p<sub>1/2</sub>, 2f<sub>5/2</sub>, 3p<sub>3/2</sub>, 1i<sub>13/2</sub>, 2f<sub>7/2</sub>, and 1h<sub>9/2</sub>. The authors find that the total strength In each multiplet is close to that found for the corresponding single-particle state In <sup>209</sup>Bi.

<sup>208</sup>Bi Levels

E(level) <sup>†</sup>	L <sup>‡</sup>	S <sup>#</sup>	Comments
0.0	1	1.07	
65 5	1	0.87	
512 5	3	1.30	
603 5	3+1	0.70+0.10	
631 @ 5	3	1.85	
652 5	3	1.40	
890 5	1	1.28	
930 5	3	0.48	
963 5	1	0.84	
1038 5	1	0.11	configuration: weakly excited. configuration=π2f <sub>7/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> established In authors' ( <sup>3</sup> He,d),(α,t) work.
1075 5	1	0.68	
1099 5	1	1.47	
1467 5	(3,1)		S: S(L=3)=0.005, S(L=1)=0.002.
1534 5	(3,1)		S: S(L=3)=0.005, S(L=1)=0.002.
1574 5	6	2.51	
1606 5			S: weak.
1630 5	6	≈0.1	configuration: Weakly excited. configuration=π1i <sub>13/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> established In authors' ( <sup>3</sup> He,d),(α,t) work.
1662 5	6	2.0	
1699 & 5	6		
1719 @ 5	6	4.13	
1734 5			S: weak.
1791 5	6	2.07	
1842 5	6	1.09	
1878 5	3,1		S: S(L=3)=0.01, S(L=1)=0.004.
1927 5	6	0.76	
2345 5	3	1.38	
2389 @ 5	3	1.87	
2413 5	3	1.38	
2431 5	6	2.74	
2462 5	3	0.68	
2506 5	3	0.45	
2665 5	3	1.60	
2688 5			S: weak.
2716 5			L: populated In ( <sup>3</sup> He,α) and tentatively assigned As L=6. S: weak.
2888 5	3	0.31	
2915 5			S: weak.
3070 5			S: weak.
3270 5	5	1.05	

Continued on next page (footnotes at end of table)

$^{209}\text{Bi}(\text{d,t}),(^3\text{He},\alpha)$  1971A105 (continued) $^{208}\text{Bi}$  Levels (continued)

<u>E(level)<sup>†</sup></u>	<u>L<sup>‡</sup></u>	<u>S<sup>#</sup></u>	<u>Comments</u>
3323 5	5	0.97	
3365 5	5	0.97	
3393 5			S: weak.
3412 5	5	2.67	
3459 5	5	1.60	
3525 5	5	0.76	
3565 5	5	2.27	
3652 5			S: weak.
3683 5			S: weak.
3716 5	5	0.72	

<sup>†</sup> The authors give only one set of energies for both the  $^{209}\text{Bi}(\text{d,t})$  and  $^{207}\text{Pb}(^3\text{He,d})$  reactions. The authors state that the uncertainty due to calibration is <5 keV. The evaluator assigns  $\Delta E=5$  keV. From a comparison with energies from (p,n $\gamma$ ), the authors' values show an average deviation of +3 keV. Where used In Adopted Levels, and for correlation with levels from other reactions, the (d,t),( $^3\text{He},\alpha$ ) values given here are lowered by 3 keV.

<sup>‡</sup> From a comparison with  $\sigma(\theta)$  In  $^{208}\text{Pb}(\text{d,t})$ .  $\sigma$  In ( $^3\text{He},\alpha$ ) is used by the authors to confirm the high L values In (d,t), In particular, L(2431)=6 and L=5 for states between 3 and 4 MeV.

<sup>#</sup> For each L, values are based on  $\sigma$  relative to that for the corresponding  $^{207}\text{Pb}$  single-hole state excited In  $^{208}\text{Pb}(\text{d,t})$ . Q value corrections were estimated from DWBA calculations. For L=1, the g.s. and 65 level are assumed to contain  $3p_{1/2}$  strength with the remaining L=1 levels containing  $3p_{3/2}$  strength. For L=3, the levels In the range 512 to 930 are assumed to contain  $2f_{5/2}$  strength with those In the range 2345 to 2888 containing  $2f_{7/2}$  strength. L=6 corresponds to  $1i_{13/2}$  and L=5 to  $1h_{9/2}$  states.

<sup>@</sup> On the basis of the large  $\sigma$ , the authors suggest that the peak observed At this energy is a doublet.

<sup>&</sup> The 1699 and 1719 levels are not fully resolved.