^{210}Bi(t,α): target=9$^-$ isomer 1977Ha07

History

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

Target ^{210}Bi isomer $J^\pi=9^-$.

1977Ha07: E=20 MeV triton beam was produced from the Los Alamos three-stage Van de Graaff accelerator. Target was 8 μg/cm^2 ^{208m}Bi on a carbon backing. Reaction products were momentum analyzed with a Q3D magnetic spectrograph and detected in a helical cathode proportional counter, FWHM≈15 keV. Measured $\sigma(\theta)$. Deduced levels, J^π, spectroscopic factors from DWBA analysis.

Sum ^{210}Bi(9$^-$)(t,α) strength/sum ^{208}Pb(t,α) strength=0.85-0.9, (excluding ^{209}Pb g.s. and 11/2$^+$ single-particle states from sum). The authors of 1977Ha07 suggest that the (t,α) on ^{210}Bi(9$^-$) proceeds mainly by pickup of the $3s_{1/2}$, $2d_{3/2}$, $1h_{11/2}$, and $2d_{5/2}$ proton-hole states. The ^{210}Bi(9$^-$) target is composed mainly of a $g_{9/2}$ neutron and an $h_{9/2}$ proton coupled to the ^{208}Pb core.

^{209}Pb Levels

E(level)	S	E(level)	E(level)	E(level)
0.0	≈1[@]	3987[#] *5*	4538 *10*	4984[#] *10*
780 *5*	≈0.033[&]	4032 *5*	4566 *10*	5022?[†] *15*
1420[‡] *5*		4080 *5*	4598 *10*	5115 *10*
3059[‡] *5*		4164[#] *5*	4701 *10*	5174[#] *10*
3530 *5*		4248 *5*	4767[#] *10*	5202[#] *15*
3657[#] *5*		4265 *10*	4837[#] *10*	5290[#] *15*
3802[#] *5*		4345 *10*	4852 *10*	5328 *15*
3839 *5*		4390[#] *5*	4937?[†] *10*	
3958 *5*		4466 *5*	4967?[†] *10*	

[†] Observed only at three angles (1977Ha07).

[‡] $\sigma(3059)/\sigma(1420)$=2.4. 1977Ha07 suggests that this ratio can be taken as a rough estimate of the relative ^{208}Pb 3$^-$ core admixtures in these two 15/2$^-$ levels. By assuming $2d_{3/2}$ proton pickup the authors obtain S(3059)/S(1420)=1.5-2.0. The sum of the cross sections to these two levels is roughly equal to that for excitation of the ^{208}Pb 3$^-$ level in ^{209}Bi(t,α). The authors suggest that this indicates that the configuration=$\nu(2g_{9/2})^{+1}\otimes 3^-$ strength is primarily contained in the 1420 and 3059 levels.

[#] Maximum cross section is larger than 150 μb/sr suggesting that the level has a configuration containing a large component of ^{210}Bi(9$^-$) coupled to a proton hole (1977Ha07).

[@] From $\sigma\approx\sigma$[^{209}Bi(t,α) to ^{208}Pb g.s.].

[&] Relative to S(g.s.)=1.