Brief Reports

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Configuration of states in ^{210}Bi from ^{209}Bi($\vec{d}$,p)

C. A. Gossett, L. D. Knutson, and P. A. Quin
University of Wisconsin, Madison, Wisconsin 53706
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The reaction ^{209}Bi($\vec{d}$,p) has been used to study the structure of the ground state multiplet of ^{210}Bi. The cross section and vector analyzing power were measured at $E_d = 12$ MeV for angles between 65° and 100°. No evidence of configuration mixing was seen in the analyzing power measurements. The cross section measurements confirm previous observations of fragmentation of the 8^- level at 580 keV.

[NUCLEAR REACTIONS ^{209}Bi($\vec{d}$, p), E_d=12.0 MeV; measured $\sigma(\theta)$, $iT_{11}(\theta)$ for 65° < θ < 100°; natural target.]

The ground state multiplet of ^{210}Bi consists of ... studied, the vector analyzing power for transitions

configuration, it has been suggested[3] that the admixture to the 580 keV level is primarily $\pi f_{7/2}\nu g_{9/2}$.

The vector analyzing power measurements for the levels in the ground state multiplet of ^{210}Bi and for the 8^- level at 916 keV are shown in Fig. 2. The solid line is a smooth curve drawn through the measured analyzing power points for the entire ground state multiplet, and thus represents the average analyzing power.

The analyzing power measurements display a gradual trend toward more negative values of iT_{11} with increasing excitation energy. Distorted-wave calculations suggest that this effect may be the result of a Q-value dependence of the vector analyzing power. This point is illustrated in Fig. 3. The solid and dashed curves in Fig. 3 show distorted-wave Born approximation (DWBA) calculations for pure $g_{9/2}$ transitions with Q values of 2.11 and 1.80 MeV, corresponding to the 0^-

of iT_{11} as a function of excitation energy for each level in the ground state multiplet and for the 8^- level at 916 keV. The solid curve is a linear fit to the data points shown. The smooth dependence of the average analyzing power on the excitation energy supports the idea that the differences in iT_{11} between the various transitions result from Q dependence of the vector analyzing power rather than from configuration mixing.

The cross section and vector analyzing power measurements of the present experiment suggest that the ^{209}Bi(d,p) transitions to low-lying states in ^{210}Bi are pure $j^\pi = \frac{9}{2}^+$. Thus, the iT_{11} data are consistent with the suggestion that the admixture in the 580 keV level is $\pi f_{7/2}\nu g_{9/2}$. However, because of the preference of low energy (d,p) reactions for low angular momentum transfers, the present data cannot rule out the possibility of a significant admixture of $\pi h_{9/2}\nu i_{11/2}$ in the level. The cross section measurements confirm earlier