quenching factor to be state dependent. Then, the quenching factor for the $d_{3/2} \rightarrow d_{5/2}$ transition is 0.31. The correct interpretation is not at all clear at this time. Analysis of the data is continuing and additional experiments are contemplated.

The $^{19}F(p,n)^{19}Ne$ spectrum also provides interesting information on the GT strength distribution. In this case almost all of the GT strength is in the mirror transition. This puts severe restrictions on the symmetry of the ground state of ^{19}F. A shell model calculation reproduces this concentration of strength reasonably well. In this case the quenching factor deduced from the mirror transition is 0.55.

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ASYMMETRY MEASUREMENTS IN THE $^{90}Zr(\vec{p},n)^{90}Nb$ AND $^{208}Pb(\vec{p},n)^{208}Bi$ REACTION

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We have found that at IUCF energies the forward angle neutron energy spectra for (p,n) reactions on medium and heavy nuclei are characterized by spinflip, isovector collective states riding on a large continuum. Concentrations of Gamow-Teller (GT) strength have been identified via angular distributions of differential cross sections consistent with a $\Delta L=0$ transition and a bombarding energy dependence characteristic of a transition mitigated by the $\vec{\sigma}\cdot\vec{\sigma}\ \vec{\tau}\cdot\vec{\tau}$ operator. This strength is fragmented in the $^{90}Zr(p,n)^{90}Nb$ reaction, in which 1^+ strength is located at 2.33 and 8.7 MeV.[2] In the $^{208}Pb(p,n)^{208}Bi$ reaction only the dominant "giant" GT state can be identified at an excitation energy above that of the IAS.[3] An additional feature of these (p,n) data is that a $\Delta L=1$, $\Delta S=1$ resonance has also been identified at an even higher excitation energy.[4]

During the past year we have extended our study of these isovector modes of excitation to the measurement of vector analyzing powers (A_y) for the (p,n) reaction on targets of ^{90}Zr and ^{208}Pb. For the ^{90}Zr target, angular distributions of A_y have been measured in the angular range from 0° to 24° and 24° to 48° using two neutron detector stations having neutron flight paths of 100 and 39 m, respectively. For the ^{208}Pb target, measurements at only a few angles have been obtained. In the present work, spectra have been measured at E_p=160 MeV in order to further investigate the nature of these excitations and of the continuum.

Figure 1 shows a sample A_y spectrum for the ^{90}Zr(p,n)^{90}Nb reaction at θ=4.2°. The indicated excitation regions associated with each previously identified state have distinct values of A_y. At these

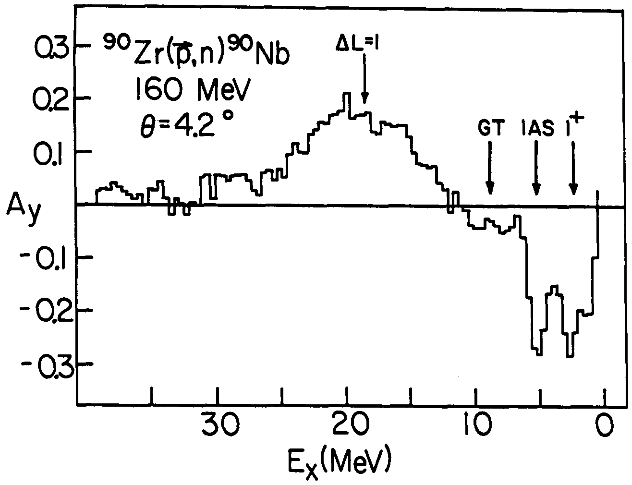

Figure 1. Analyzing power for the ^{90}Zr(p,n)^{90}Nb reaction at 4.2°. The uncertainty in A_y is about ±0.02.

forward angles the continuum, does not appear to have a significantly non-zero A_y. Preliminary extraction of the A_y data for the lower 1^+ state differ from that for the giant GT, possibly reflecting the expected difference in the dominant particle-hole configurations. Alternately the A_y of the broad ΔL=1 resonance do not appear to exhibit a strong excitation energy dependent variation consistent with discrete concentrations of 0^-, 1^-, and 2^- strength.[5] The back angle A_y spectra are dominated by the continuum. Data have been obtained over an excitation range of 0 to 60 MeV. As the angle increases from 15° to 48°, the A_y become increasingly more positive. The largest A_y at each angle are associated with the lowest excitation energies, with the maximum A_y reaching a value of about +0.5 at θ=48°.

Further reduction of the data and DWIA calculations are in progress.

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STUDY OF THE (d,^{2}He) REACTION AT E_d = 99 MeV

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The ability to measure the strengths of ΔL=0, ΔJ=ΔS=ΔT=$|\Delta T_z|$=1 transitions in the T_z direction of increasing neutron excess would be of great general utility in probing nuclear structure and would have