probably as described above. However, the shapes of these differential cross sections are generally farily well given.

The particle-hole model wave functions given by Gillet and Vinh-Mau[2] have been used frequently in using the DWBA program. For some even parity states, only a collective model parameterization was used; the microscopic description of these states is sufficiently complex to make a microscopic DWBA calculation very difficult.

The data obtained from inelastic scattering of 135 MeV protons from ^{13}C are partially analyzed, and experimental differential cross sections have been obtained for all states up to 10 MeV excitation. The magnetic dipole state at 15.11 MeV excitation ($3/2^-$, T=3/2) is also excited, as well as states at higher excitation. One or more states giving rise to a peak ($\Gamma \sim 300$ keV), corresponding to an excitation of 21.3 MeV, have a differential cross section which qualitatively resembles those seen in neighboring nuclides for "high spin", or orbital flip, states. Another neighboring state, at 21.8 MeV excitation, is observed to be excited by 135 MeV incident proton energy, but does not appear in spectra taken at 80 MeV bombarding energy[3]. Work is continuing both on the reduction of experimental data, and on making DWBA fits to the experimental differential cross sections.

1) H. Eikemeier and H.H. Hackenbroich, Nucl. Phys. A169, 407 (1971).

2) V. Gillet and N. Vinh-Mau, Nucl. Phys. 54, 321 (1964).

3) D.W. Devins et al., submitted to the APS Washington Meeting (1980).

ASYMMETRY MEASUREMENTS FOR THE $^{12}C(\vec{p},p')^{12}C$ REACTION

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In continuation of a program to study microscopic effective nucleon-nucleus interactions, measurements have been made of the analyzing powers of the $^{12}C(\vec{p},p')^{12}C$ reaction at 120 MeV to the ground state and several excited states. An experiment to measure the cross sections for several transitions has been completed and submitted for publication.[1]

There are four states of ^{12}C that are of particular interest for elucidating the features of microscopic effective interactions. These are the 2^+ states at 4.44 MeV (T=0) and 16.11 MeV (T=1), and the 1^+ states at 12.71 MeV (T=0) and 15.11 MeV (T=1). Each of these is particularly sensitive to a different term of the central part of the effective interaction, which must then be combined with spin-orbit and tensor terms. A successful description of the effective interaction must also have a good description of these latter terms. While differential cross section measurements can show some sensitivity to the effective interaction, analyzing power data have an even greater sensitivity.

The previous interpretation of the cross-section data in terms of a detailed microscopic interaction was reasonably successful.[1] The best results were

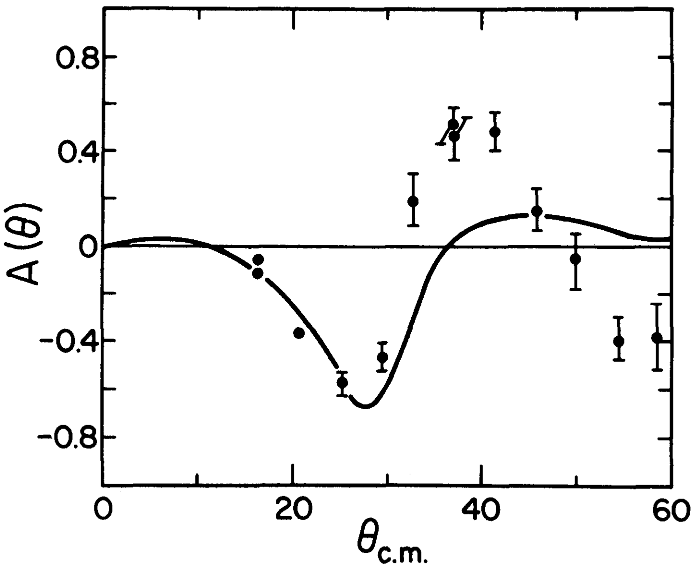

Figure 1. Analyzing power for (p,p') reaction to 15.11 MeV state in ^{12}C at 120 MeV. The curve is a theoretical prediction based on the procedures of Ref. 1.

found for the 15.11 MeV transition, which is dominated by one-pion exchange. Analyzing power data are compared with the predictions of the same interaction in Fig. 1. The predicted shape agrees well with the data over the same range of angles for which good agreement is found for the cross sections, but the magnitude of the oscillations is too small.

Data acquisition for ^{12}C was completed in January, 1980 and the data are being analyzed. Additional measurements are planned for the 2.31 MeV transition in ^{14}N (1^+, T=0 → 0^+, T=1) which is dominated by the tensor interaction.

1) J.R. Comfort, S.M. Austin, P.T. Debevec, G.L. Moake, R.W. Finlay, and W.G. Love, IUCF Annual Report 1977, p. 91 and Phys. Rev. C (to be published).

INELASTIC PROTON SCATTERING FROM ^{12}C: A SEARCH FOR NUCLEAR PRECRITICAL OPALESCENCE

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Following the suggestions of Toki and Weise,[1] Delorme et al.,[2] and Ericson,[3] an attempt is being made to observe an indication of nuclear precritical phenomena near pion-condensation thresholds. In particular, precritical phenomena, sometimes referred to as precritical opalescence, might be expected to show up as a cross-section enhancement at high momentum transfer, $q \sim (2\text{-}3) m_\pi c$, of inelastic nucleon scattering to states that carry the quantum numbers of the pion, i.e. T=1, unnatural parity.

Proton inelastic scattering to the 15.11 MeV state in ^{12}C is thought to be a favorable reaction for observing this effect, particularly since the transition appears to be well described as a spin-flip, isospin-slip transition that carries a large part of the M1 strength.

A run was taken at a bombarding energy of 155 MeV. Angular distributions for the 15.11 MeV state (1^+, T=1), as well as the 12.71 MeV (1^+, T=0) and 16.11 MeV (2^+, T=1) states are shown in Fig. 1. It can be seen that a peak in the right region is seen for the 15.11 MeV state. A similar enhancement of the transverse form factor $|F_T|^2$ for the 15.11 MeV state has been observed in inelastic electron scattering.[4] These results to some degree confirm earlier work of Buenard[5] who, with poorer quality data at fewer angles, reported a stronger peak in the same region.

Of course, one angular distribution does not