agreement at all energies with the photo-disintegration data of O'Fallon et al. and with those of Ref. 2. The preliminary results of the analyzing power measurements are shown in Fig. 4. We plan to complete the analysis of the data in the next few months.

*Present address: Universitat Basel, Basel Switzerland

†Present address: CERN, Geneva, Switzerland

§Present address: TRIUMF, Vancouver, B.C. Canada

1) F. Prats, Phys. Lett. 88B, 23 (1979).

2) R. Abegg et al., Phys. Lett. 118B, 55 (1982).

3) J.P. Didelez et al., Nucl. Phys. A143, 602 (1970).

4) N.M. O'Fallon, L.J. Koester, and J.M. Smith, Phys. Rev. C 5, 1926 (1972).

RADIATIVE CAPTURE OF TENSOR POLARIZED DEUTERONS ON HYDROGEN ISOTOPES

M. Hugi*, H.J. Karwowski, W.K. Pitts, J.D. Brown, V.R. Cupps, H.O. Meyer, P. Schwandt, and I.J. VanHeerden
Indiana University Cyclotron Facility, Bloomington, Indiana 47405

Radiative capture in few nucleon systems is, by now, an established, ongoing experimental program at IUCF. A variety of physics questions are addressed by such measurements. For example, the $^2H(d,\gamma)^4He$ reaction is interesting in that measurements of the tensor analyzing powers are naturally sensitive to the D-states of the final nucleus.

We took differential cross section vector (A_y) and tensor (A_{yy}) analyzing power data for deuteron capture at E_d = 80 MeV on both hydrogen and deuterium during a fifteen shift run in October 1983. The $^1H(d,\gamma)^3He$ measurements extended the $^2H(p,\gamma)^3He$ measurements of Exp. #207 to lower energies. In addition the $^1H(d,\gamma)^3He$ reaction serves as a "set-up" reaction for the more difficult $d(d,\gamma)^4He$ measurement, since the former has a cross section which is more than a factor of 100 larger.

The experimental setup was similar to that described in the preceding contribution, but with a modified charged particle telescope to allow detection of the low energy ^{3},^{4}He recoils. Detection of both the photon and the outgoing residual nucleus gave very clean spectra, with the ^{3}He background from competing reactions estimated to be about 2-3%.

While $p(d,\gamma)^3He$ is interesting in its own right, the major purpose of this experiment was the study of the $d(d,\gamma)^4He$ reaction. The salient features of this reaction are:

1) It is the simplest isoscalar process, proceeding via an E2 multipole transition.

2) Many meson exchange currents do not contribute, because of the spin-isospin structure of the reaction. This fact, along with (1), should simplify the theoretical analysis considerably.

3) The measurement of A_{yy} should give a clean measurement of the asymptotic normalization of the D-state probability of ^{4}He.

While it has been known for some time that ^{4}He possesses a non-zero D-state probability,[1] previous measurements of the relative D- to S-state probability which relied on (d,α) pick-up reactions[2] are not unambiguous.[3]

Existing data at 20 MeV[4] for the cross section have been in good agreement with theoretical expectations, showing the $\sin^2 2\theta$ distribution expected of an E2 transition. At 376 MeV, where only a small amount of data exists,[5] strong deviations from the $\sin^2 2\theta$ -shaped angular distribution were reported and a maximum in differential cross section was observed at θ_{cm}=90° instead of the expected minimum value.

Preliminary analysis of the data shows a ^{4}He peak

in the charged particle energy-TOF plane that is clearly distinguishable from the background. The major experimental difficulty of this experiment is the low rate for real events (about 1-3 per hour per photon detector) resulting from the low luminosity and small cross section (1-3 nb/sr in the lab). We are therefore currently optimizing the equipment to improve the data rate as much as possible.

*Present address: TRIUMF, Vancouver, B.C. Canada

1) G.R. Plattner et al., Phys. Rev. Lett. 34, 830 (1975).

2) F.D. Santos et al., Phys. Rev. C 25, 3243 (1982).

3) J.A. Tostevin, Phys. Rev. C 28, 961 (1983).

4) J.M. Poutissou and W. Del Bianco, Nucl. Phys. A199, 517 (1973).

5) B.H. Silverman et al., Phys. Rev. C 29, 35 (1984).