

D.A. Hutcheon, C.A. Miller, R. Abegg, J. Uegaki, J. Wesick, H.S. Wilson, J.M. Cameron, C.A. Davies, P. Kitching, H. Fielding and J. Soukup
University of Alberta, Edmonton, Alberta, Canada, T6G 2N5

A.W. Stetz

Oregon State University, Corvallis, OR 97331, USA

I.J. van Herden

Univ. of the Western Cape, Private Bag X17, Bellville 7530,
Republic of South Africa

Y.M. Shin and N. Stevenson, Univ. of Saskatchewan, Saskatoon,

Sask. Canada, S7N 0W0.

A study at intermediate energies of the $np+d\gamma$ reaction, or the inverse photo-disintegration reaction, should lead to a better understanding of the off-shell behaviour of the nucleon-nucleon potential, of meson exchange current effects¹⁾, and possibly of quark degrees of freedom in the 2-nucleon system. A convincing demonstration of any of these effects is hampered by the inconsistencies in both predicted and measured values for differential cross sections in the energy region $T_n=200$ to 500 MeV²⁾. We have begun measurements of analyzing power and differential cross section for the $\bar{n}p+d\gamma$ reaction in this energy regime, and results for analyzing powers at 180 and 270 MeV have been published³⁾. Data were taken using the neutron beam at TRIUMF and a liquid hydrogen target. Deuterons and gammas were detected in coincidence, the latter in lead-glass Cerenkov counters and the former in thick plastic scintillators. The deuteron detection system also included multiwire chambers for trajectory reconstruction, and a thin start counter for time-of-flight measurements. This detector system provided identification of the $np+d\gamma$ process with very low backgrounds. Cross sections are normalized to the charge exchange reaction $np+pn$ which was observed at the same time as the radiative capture. We will report on cross sections at 180 and 270 MeV over an

CERN LIBRARIES, GENEVA



CM-P00067337

1. H. Arenhövel, W. Fabian and H.G. Miller, Phys. Lett 52B (1974) 303.
2. W.Y.P. Hwang, J.T. Londergan and G.E. Walker, Ann. Phys. (NY) 149 (1983) 335.
3. J.M. Cameron et al., Phys. Lett. 137B (1984) 315.