

THE (p,n) REACTION AT INTERMEDIATE ENERGIES WITH THE ISOTOPES OF OXYGEN
(^{16}O , ^{17}O , ^{18}O) and ^9Be AS PART OF A UNIFIED APPROACH TO THE STUDY OF THESE
NUCLEI

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Combining (p,n), (p,p'), and (e,e') elastic and inelastic scattering data from ^{17}O and ^{18}O should aid in resolving uncertainties associated with the nuclear structure of these systems. The reason is that the nucleon-nucleus and the electron-nucleus interactions are basically different; therefore each reaction would test proposed models in a different way.

During a two-shift preliminary run at 119.8 MeV in October 1977, we obtained some preliminary time-of-flight spectra of neutrons at angles of 1° , 7° , 19° , and 24° . In Fig. 1, we display the excitation energy spectra in ^{16}F . The state at about 6 MeV of excitation energy, which is dominant at 24° , is believed to be a high-spin (4^-) state predicted by Moffa and Walker.¹

The BeO targets had the isotopic compositions listed below in the first three rows:

	Atomic Percent of Oxygen Isotopes		
	^{16}O	^{17}O	^{18}O
Be ^{16}O	99.8	0	0.2
Be $^{16}\text{O}+^{18}\text{O}$	56	1	43
Be $^{17}\text{O}+^{17}\text{O}+^{18}\text{O}$	14	20	66
Be ^{17}O	5	90	5
Be ^{18}O	5	0	95

Targets with isotopic compositions approximating those listed in the fourth and fifth rows above

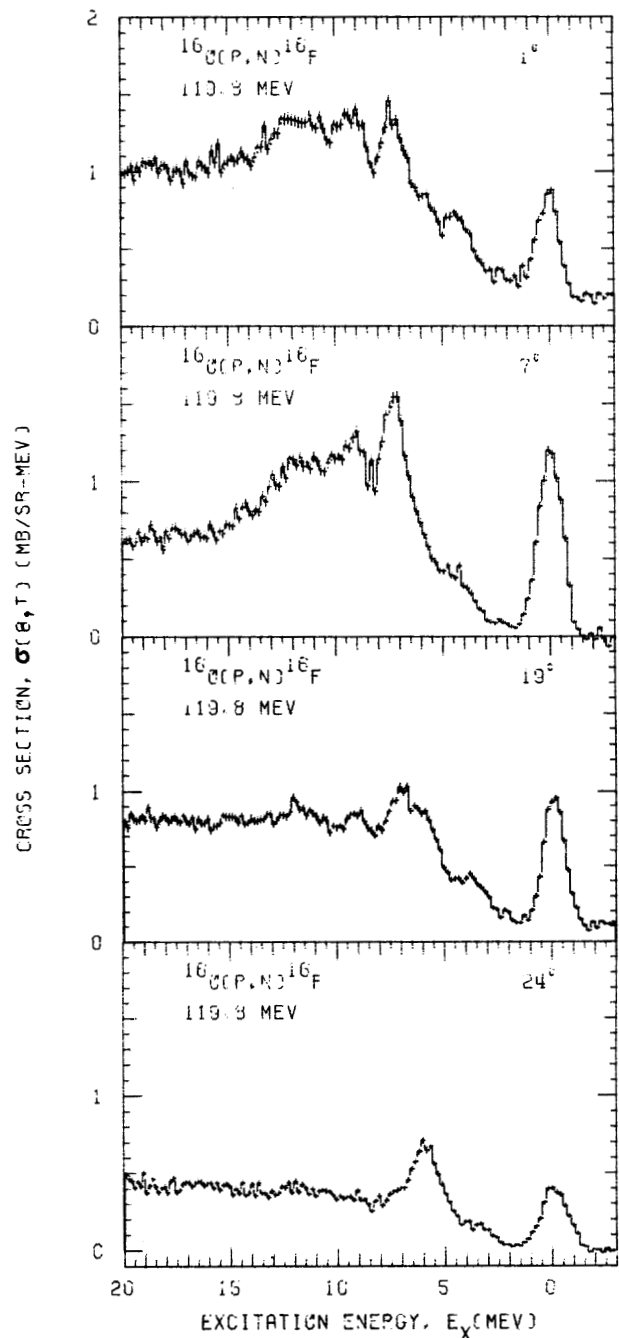


Figure 1.

will be used when this experiment is carried out.

With the beam swinger facility, we will be able to look at angles out to 70° corresponding to momentum transfers up to 3 inverse fermis for 140 MeV incident protons. We plan also to improve the energy resolution by increasing the flight path from the 29 meters used in the exploratory run to 50 meters in the angular range from 0 to 24° .

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- 1) P.J. Moffa and G.E. Walker, Nucl. Phys. A222, 140 (1974).