Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Incorporating position sensitivity into an E x B design microchannel plate detector[1] J. HUSTON, B. WIGGINS, J. JOHNSTONE, J. VADAS, A. WHITEMAN, S. HUDAN, R.T. DESOUZA, Indiana Univ - Bloomington — Many radioactive beam experiments whether utilizing fast or reaccelerated beams benefit from imaging the beam continuously through the experiment. Moreover, providing position information on a particle-by-particle basis allows tracking which reduces the angular uncertainty. Such capability can be realized by using an ExB microchannel plate detector (MCP). Passage of a single ion through a thin secondary emission foil generates electrons that are transported to an MCP by the crossed electric and magnetic fields. Simulations with the ion transport code SIMION demonstrate that the image of the beam on the secondary emission foil is largely preserved in one dimension through the electron transport. To make the MCP position sensitive, the standard metal anode was replaced with a multi-strip anode. Strips in the anode, which collect the electron cloud, are coupled to a delay line. The time difference between the arrival of the signal at either end of the delay line provides the position information. In this talk the design, construction, and commissioning of the detector will be described. Simulations that describe the electron transport and determine the position resolution achieveable will be presented.

[1]U.S. Department of Energy under Grant Nos. DE-FG02-88ER-40404 and NSF Graduate Research Fellowship under Grant No. 1342962

Jacob Huston
Indiana Univ - Bloomington

Date submitted: 11 Jan 2018 Electronic form version 1.4