The Production of Leading Fragments by Heavy Nuclei

U. Minnesota - Washington U., St Louis - Caltech
UHIC Collaboration

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Physics Goals:	Production of heavy fragment nuclei in many targets
Beams:	Kr,Ag,Xe,La,Ho and Au at 0.5-1.4A GeV
	Au at 10.6 A GeV
Targets:	H, CH2, Li, C, Al, Cu, Sn, Pb.

Physics Summary

An array of plastic Cherenkov counters, parallel plate ion chambers and MWPCs has been used to study the interactions of numerous beams of heavy relativistic ions in a wide variety of targets. The charges of nuclei incident on the array have been verified in detectors placed in front of an automated target changer. Incident nuclei and produced heavy fragments from the targets are examined by the downstream detectors. These measure signals that depend on the sum of the squares of the charges of all the particles produced in an interaction. So long as there is a "leading" fragment, with a charge that is not more than 20 to 30 charges less than that of the projectile, its charge is determined uniquely. The charge resolution obtained from the Č and I detectors is between 0.12 and 0.16 of a charge unit, which is even adequate to resolve the very small number of nuclei undergoing charge pickup from the very large number of incident nuclei that do not interact. Basically similar versions of this array have been used to exmine the interactions of the projectiles listed above in some or all of the listed targets. Some 2100 partial cross sections for the production of heavy fragments have been determined.

Selected Publications

"Charge-pickup by heavy relativistic nuclei", B. S. Nilsen *et al.*, Phys.Rev. C **50**, 1065-1076 (1994).

"Some preliminary results from the new 10.6 GeV/nucleon gold beam at Brookhaven", C. Jake Waddington, Int. J. Mod. Phys. E **2**, 739-766 (1993).

"Determination of the cross sections for the production of fragments from relativistic nucleus-nucleus interactions, Parts I and II", J. R. Cummings *et al.*, Phys. Rev. C **42** 2508 and 2530 (1990)

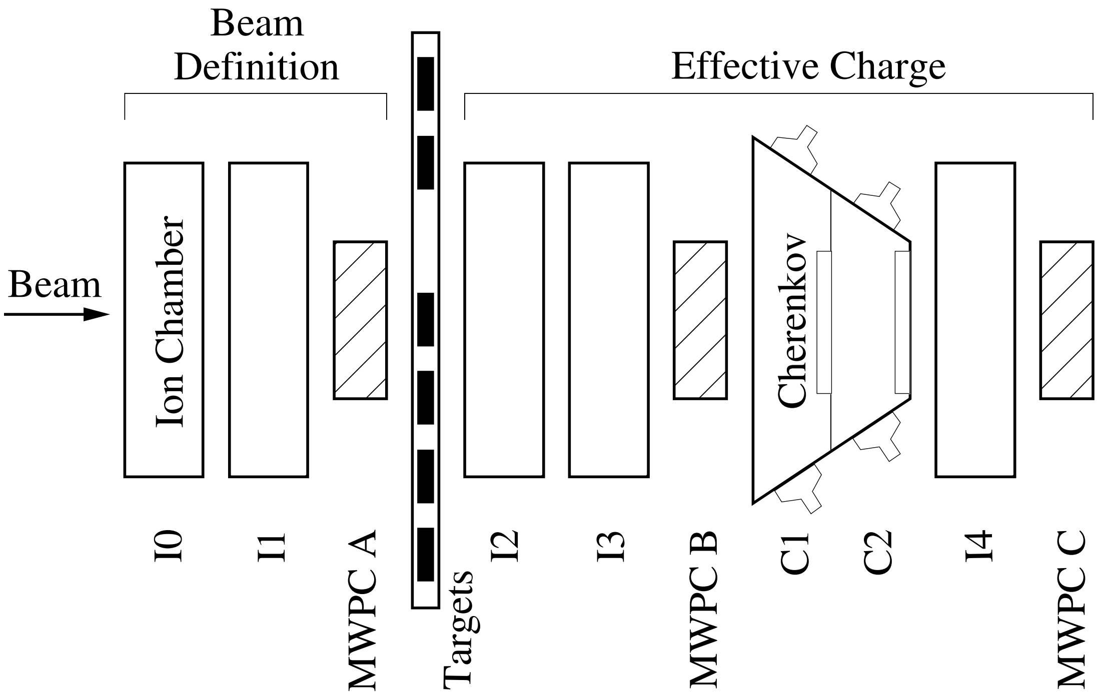

Figure 1: Schematic diagram of the detector array used in Exp. 869 at BNL to study high energy gold nuclei. Five ion chambers, I-0 to I-4, and two Cherenkov counters C-1 and C-2 were interspaced with three multiwire proportional counters, MW. Targets were moved in and out of the beam by the target holder

Related Experiments

HEAO-C3