

Particle Production Measurements using the MIPP Detector at Fermilab

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The Main Injector Particle Production (MIPP) experiment at Fermilab is a fixed target hadron production experiment. It measures particle production in interactions of 120 GeV/c primary protons from the Main Injector and secondary beams of π^\pm , K^\pm , p and \bar{p} from 5 to 90 GeV/c on nuclear targets which include H, Be, C, Bi and U, and a dedicated run with the NuMI target. MIPP is a high acceptance spectrometer which provides excellent charged particle identification using Time Projection Chamber (TPC), Time of Flight (ToF), multicell Cherenkov (CKOV), Ring Imaging Cherenkov (RICH) detectors, and Calorimeter for neutrons. We present inelastic cross section measurements for 58 and 85 GeV/c p-H interactions, and 58 and 120 GeV/c p-C interactions. A new method is described to account for the low multiplicity inefficiencies in the interaction trigger using KNO scaling. Inelastic cross sections as a function of multiplicity are also presented. The MIPP data are compared with the Monte Carlo predictions and previous measurements. We also describe an algorithm to identify charged particles ($\pi^\pm/p/p$ etc.), and present the charged pion and kaon spectra from the interactions of protons with H, C and NuMI targets for both the data and Monte Carlo.

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Primary author: Ms MAHAJAN, Sonam (Panjab University, Chandigarh)

Co-author: Dr RAJA, Rajendran (Fermi National Accelerator Laboratory, Batavia, IL, USA)

Presenter: Ms MAHAJAN, Sonam (Panjab University, Chandigarh)

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