Leading Baryon and Anti-proton Measurements in p-A Collisions at AGS energies

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Abstract

Studies of proton-nucleus collisions (p-A) are essential to disentangle the dynamics of nucleus-nucleus colliions. We will address two outstanding questions, baryon stopping and anti-baryon production, using E941 p-A data. Our unique measurement of both leading protons and neutrons will allow us to investigate mechanisms for baryon stopping at the AGS. We have measured anti-proton production in p-A collisions, which has interesting implications on the large anti-hyperon to anti-proton ratio previously observed by the E864 in heavy ion collisions. The E941 at the AGS, which uses the E864 spectrometer with its high data rate and large acceptance, is devoted to the study of energy loss and isospin exchange of the projectile nucleon and to the study of the production and absorption of antiprotons inside the nuclear medium. Using four targets (Be, Al, Cu, and Pb) and two proton beam momenta, 12 and 18 GeV/c, we have measured the target and energy dependence of the yields for both charged and neutral leading baryons as well as for antiprotons. We will present comparisons of these new data with other experimental results and with model calculations to provide insight into the dynamics of both p-A and A-A collisions.

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