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Title: Improved Particle Identification from Time of Flight Data in Polarized Proton-Proton collision.

Abstract:

One way to study the spin structure of the proton is through the collision of spin-polarized proton beams. The Relativistic Heavy Ion Collider (RHIC) is capable of colliding spin-polarized protons with energies up to 510 GeV in the center of mass. The collisions produce jets of high-energy particles, whose distributions can be used to explore fundamental properties of proton spin structure, e.g., through the Collins asymmetry. To achieve this, we measure the distributions of particles resulting from the collision. The Solenoidal Tracker At RHIC (STAR) collects a variety of data, such as energy loss (dE/dx) in the Time Projection Chamber (TPC) and particle time-of-flight (β) in the TOF detector. We use these to identify the species of charged particles within jets, e.g. distinguishing pions, kaons, and protons. We analyze the momentum dependence of the TOF and TPC distributions, fitting the β with a Student's t-distribution and the dE/dx with a Gaussian distribution. We use the centers and widths from the β distribution to calculate the likelihood that a given particle is a pion, kaon, or proton. We will present a status report of the TOF-TPC analysis for proton-proton collision data at $\sqrt{s}$ = 510 GeV collected in 2017.