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A Novel Time of Flight Detector for the Pioneering High Energy Nuclear Interaction eXperiment[1] RICHARD DIX, KIRK DRUMMOND, WILLIAM POWELL, Morgan State University, MICKEY CHIU, Brookhaven National Laboratory, PIONEERING HIGH ENERGY NUCLEAR INTERACTION EXPERIMENT COLLABORATION — Time-of Flight (TOF) detectors allow one to identify particles created in collider experiments. The Pioneering High Energy Nuclear Interaction eXperiment (PHENIX) at the Relativistic Heavy Ion Collider at Brookhaven National Laboratory is proposing new forward timing detectors to measure the TOF with a 10 picosecond (ps) timing resolution. A prototype of the detector electronics system was tested by using Cherenkov signals from cosmic rays and translating them into digital signals. Each signal was split and delivered to two analog-to-digital-converters (ADCs). C++ and ROOT were used to write programs to compare voltage readings reported by the two ADC channels and determine the time difference between them, which was 76 ps. Using new ADCs, which run 17 times faster, the timing resolution will be 5 ps. This will allow PHENIX to probe the meson-baryon anomaly at intermediate, transverse momentum by making detailed measurements in a psuedorapidity region which has not been well measured.

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