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(G*) (POS-32) A mirror study in an ARICH detector for a hadron production experiment

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A Ring Imaging Cherenkov (RICH) detector allows the identification of charged particles through the measurement of the emission angle of the Cherenkov light produced by the passage of particles with speeds greater than the speed of light in the detector medium. An Aerogel Ring Imaging Cherenkov (ARICH) device uses aerogel material as a radiator medium to achieve a desirable index of refraction. The EMPHATIC (Experiment to Measure the Production of Hadrons At a Test beam In Chicagoland) is a low-cost, table-top-sized, hadron-production experiment located at the Fermilab Test Beam Facility (FTBF) that will measure hadron scattering and production cross sections that are relevant for neutrino flux predictions such as those necessary for neutrino oscillation studies with the Hyper-K experiment. High statistics data will be collected using a minimum bias trigger, enabling measurements of all relevant cross sections. Particle identification will be done using silicon strip detectors, a time-of-flight (ToF) wall, and a lead glass calorimeter array in combination with the ARICH detector. The ARICH focuses on the kaons, pions and protons identification in a multitrack environment up to 8 GeV/c. In my presentation I will discuss the simulations and mechanical studies for the implementation of optical mirrors in the ARICH system to increase the angular acceptance of the detector as a low cost improvement.

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