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## Cherenkov Detector work at Stony Brook University

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The Stony Brook University group has been involved with Cherenkov detector work for many years and our accomplishments include the RICH detector in PHENIX (photo-tube RICH) and the Hadron-Blind Detector (HBD), a windowless Cherenkov detector based upon CsI photocathodes directly placed upon the top surface a Gas Electron Multiplier (GEM). More recently, we have extended the work on CsI GEM photocathodes ion connection with the R&D program of leading to the future Electron-Ion Collider (EIC). These efforts include both a focused RICH detector and hybrid TPC/HBD tracking threshold-Cherenkov detector. The focused RICH featured a 5-layer GEM-stack coupled directly to a 1 meter-long radiator section. A commercial mirror with reflectivity in the deep UV focused rings onto the photocathode. The detector was tested both at SLAC (9 GeV/c electrons) and at Fermilab (mixed hadron beams with energies from 20 GeV/c to 32 GeV/c). Excellent pi/K/p separation was observed at all energies with 12 photo-electrons per ring. The TPC/HBD device combines Time-Projection Chamber tracking with threshold Cherenkov light detection using the same gas volume. The “exit side” of the field cage is made optically transparent using wire planes and the drift direction is set perpendicular to the track trajectory. This device was successfully tested in April 2016 at Fermilab and first results will be presented in this talk.

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