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R&D on Large GEM for the Forward Tracking at the Future Electron Ion Collider

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A vigorous tracking and particle identification detector R&D (eRD6 / eRD3) program administered at the Brookhaven National Laboratory (BNL) is currently being carried out to address some of the detector challenges of the future high luminosity polarized Electron Ion Collider (EIC) envisioned to be next-generation US facility for the Nuclear Physics programs. We present the status of the R&D on large GEM for the EIC Forward Trackers (EIC-FT) focus on the design of 1-meter-long, trapezoidal shape triple-GEM prototype and the new two-dimensional stereo-angle (U-V) strip readout developed to specifically address the spatial resolution requirement ($r\Phi$ < 100 μm) for an EIC-FT detector. A new connection scheme to connect the front-end electronics to the detector (U-V) readout strips, based on zebra strip contacts was investigated. The advantages of zebra connection, largely used for electrical contact in commercial application such as LCD display, are presented and preliminary test results of the proof of concept on a small prototype are discussed. To conclude, we also present new areas of investigation of our detector R&D such as the Chromium GEM foil (Cr-GEM) being tested as potential candidate for for low mass triple-GEM detector

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