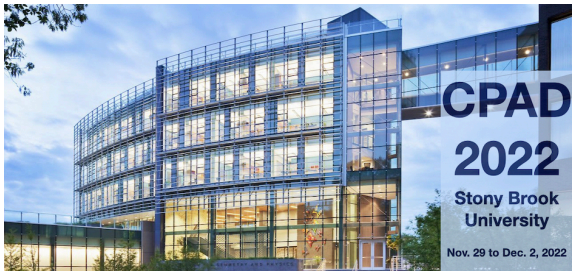

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Design Concept of Imaging Barrel Electromagnetic Calorimeter for the Electron-Ion Collider

Wednesday, 30 November 2022 08:50 (20 minutes)

The Electron-Ion Collider (EIC) will be an experimental facility to explore the gluons in nucleons and nuclei, shedding light on their structure and the interactions within. Physics goals, detector requirements, and technologies at the EIC are outlined and discussed in the EIC community White Paper and Yellow Report. In particular, for the barrel electromagnetic calorimetry, the electron energy and shower profile measurements play a crucial role in the separation of electrons from background pions in deep inelastic scattering processes. Moreover, the calorimeter must measure the energy and position of photons, identify single photons originating from deeply virtual compton scattering process, and photon pairs from π^0 decays. Based on detector requirements, we propose a design of the imaging barrel electromagnetic calorimeter. It is a hybrid design utilizing imaging calorimetry based on monolithic silicon sensors (AstroPix) and scintillating fibers embedded in Pb. We have studied the proposed calorimeter in detail through realistic simulations to test it against the requirements for the physics case described in the EIC community Yellow Report. In this talk, I will present the expected calorimeter performance based on simulations with 3 T magnetic field and the outlook of the upcoming R\&D program related to the imaging calorimetry will be also presented.

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