Contribution ID: **139**   Type: **Contribution Talk**

AC-LGAD detectors for Spatial and Timing Measurements at the Electron-Ion Collider

Tuesday, 29 November 2022 17:00 (20 minutes)

The Electron Ion Collider (EIC), the next Nuclear Physics flagship facility, will be constructed at Brookhaven National Laboratory over the next decade. The EPIC detector will be the first experiment at the EIC dedicated to detailed studies of the structure of nucleons and nuclei in electron-proton and electron-ion collisions.

The ambitious physics program of the EIC requires hermetic particle identification spanning a wide momentum range. In EPIC, a dedicated time of flight (TOF) detector system will cover the lower end of the expected momentum spectrum, while simultaneously providing high resolution position information to aid in track reconstruction. Detectors in the far-forward direction, such as Roman Pot detectors, have similar requirements in spatial and temporal resolution for the detection of scattered protons at very small angles.

The AC-coupled low gain avalanche detector (AC-LGADs) is the currently preferred technology for both the TOF and Roman Pot detectors in EPIC. They have demonstrated precise spatial resolution as low as 10um while providing a TOF precision of 20-30ps for single MIPs. Various studies on sensor design and characterization, frontend readout ASIC R&D as well as system design and integration are underway within the EPIC collaboration.

In this talk, we will present the layout, specifications, R&D status and plans to develop the full system design for EPIC.

Primary author: HARTBRICH, Oskar (Oak Ridge National Lab)

Presenter: HARTBRICH, Oskar (Oak Ridge National Lab)

Session Classification: WG1: Solid State Detectors and ASICs

Track Classification: WG1: Solid State Detectors and ASICs