Contribution ID: **71** Type: **not specified**

Transitioning to EPICS at EIC: UDP-Based Waveform Monitoring

Tuesday 17 September 2024 16:50 (20 minutes)

Brookhaven National Lab's Electron-Ion Collider (EIC) project plans to transition from Accelerator Device Object (ADO) framework developed for the Relativistic Heavy Ion Collider (RHIC) applications, to the EPICS framework for new equipment control and monitoring. As part of performance testing for EIC, LLRF group received an arc detector chassis from Jefferson National Lab that was equipped with EPICS functionality. After successfully installing the chassis and initializing an IOC, it became apparent that certain critical values, such as snapshots of the raw waveform from the arc detector heads, were only accessible via a UDP protocol not supported by the EPICS implementation. To address this, software was developed in Python to periodically request the waveform data of each detector head using the caproto library and integrate them into an EPICS IOC. This IOC was then converted for use with existing RHIC controls protocol using EPICS-ADO Bridge developed by Andrei Sukonov at BNL, to allow for seamless monitoring and evaluation.

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Session Classification: EPICS Meeting Talks

Track Classification: Hardware, Driver/Device support