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New Applications of the RHIC LLRF Platform (1): Bunch by Bunch Damping and Transient Beam Loading Compensation at RHIC

Initially commissioned in 2010, the RHIC LLRF Platform has seen its range of application grow steadily and rapidly. Platform based LLRF systems are now operational at RHIC, AGS, EBIS (Electron Beam Ion source) and the R & D ERL (Energy Recovery Linac), and are in commissioning or development for the AGS Booster, the Coherent Electron Cooling Proof of Principle (CeC Pop) Experiment at RHIC, and for RHIC Bunch by Bunch Transverse Damping. During the RHIC Run 13 and 14 Polarized Proton operational periods, the RHIC LLRF system was extended to add bunch by bunch longitudinal damping as well as compensation of transient beam loading. The RHIC LLRF Platform flexibility and scalability were critical factors in enabling the rapid development and commissioning of these new capabilities. This paper will describe the concepts and system components for both applications, highlight the Platform features which made these developments possible, and illustrate the impact these new capabilities had on RHIC operational performance.

Primary author: SMITH, Kevin (BNL)

Co-authors: SEVERINO, Freddy (BNL); NARAYAN, Geetha (BNL); MERNICK, Kevin (BNL)

Presenter: SMITH, Kevin (BNL)