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## LLRF Developments at the BNL Collider-Accelerator Department

*Monday, 10 October 2005 12:30 (30 minutes)*

The RF group within the BNL Collider-Accelerator Department (BNL C-AD) supports the development, operations and maintenance of RF systems for three operational synchrotrons (AGS Booster, AGS and RHIC), and is also responsible for RF system development for a number of upgrades and projects both planned or in progress. Active projects include the C-AD LLRF Upgrade (upgrade of AGS Booster, AGS and RHIC LLRF systems), the Electron Beam Ion Source (EBIS) project (a high charge state heavy ion injector for the AGS Booster), and the Super Conducting Energy Recovery Linac (SC-ERL) experiment (a very high current SC-ERL prototype and SC RF photo-cathode gun). Planned projects include the Rare Symmetry Violating Processes (RSVP) upgrade (1E14 protons per pulse, 2.5Hz AGS upgrade), and a possible Super-Neutrino Driver (high current SC proton linac for AGS injection). With very limited LLRF engineering resources available to support all these efforts, the decision was made to focus development efforts at designing a common digital hardware platform, modular in nature, which could then be configured as necessary to satisfy the unique requirements of the various LLRF systems. We believe such a system offers a number of significant benefits, including: maximum leveraging of very limited engineering resources; reduction in the number of unique hardware components we need to produce, operate and maintain; flexibility in individual LLRF system configuration; flexibility of future upgrade options; and, greatly reduced risk from component obsolescence. Our talk and poster will describe the architecture as currently envisioned, lessons learned from the RHIC, Booster and SNS Ring LLRF designs, the various LLRF system requirements, and the factors effecting design decisions and tradeoffs.

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