

Closeout Bullets: One-Day Site Visit of the Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory (BNL)
September 18, 2018

Comments:

- The increase of diversity on the leadership team and efforts to continue making progress is commended.
- The Relativistic Heavy Ion Collider (RHIC) continues to produce impactful physics results in both heavy ion physics and spin physics. We are concerned that the Pioneering High Energy Nuclear Interaction eXperiment (PHENIX) is having challenges identifying adequate workforce to complete analyses on priority physics topics from their data sets. The RHIC management should work with PHENIX management and report on a plan to address the analysis of priority physics topics by the upcoming Lab Manager Budget Briefing (LMBB).
- The Nuclear Theory Group successfully responded to the most recent National Laboratory Nuclear Theory group review. The Group continues to provide important scientific output and an active and vibrant environment for the training of the next generation of nuclear theorists. Attracting a large number of postdoctoral fellows and the increased collaboration with Stony Brook University (SBU) are particularly valuable. It is noted that the current level of activity will not be sustainable based on constant-effort Nuclear Physics (NP) funding.
- Operations in FY 2018 with six different modes and rapid changing between setups and high reliability is a significant achievement.
- The Laboratory has made progress in the needed Machine Protection System (MPS) upgrade to prevent 10-20 abort kicker pre-fires per year, some of which caused damage to detector components in the past. Cost effective solutions are each being pursued in parallel, including tests conducted during run 18. The strong progress on understanding the cause of prefires will be important for current and future (sPHENIX) operations.
- The Low Energy RHIC electron Cooling (LEReC) Accelerator Improvement Project (AIP) is critical for the lower beam energies of the Beam Energy Scan II (BES-II). The Collider-Accelerator Department (C-AD) staff is commended for achieving all key performance parameters (KPPs) for LEReC before the scheduled milestone date. We look forward to commissioning with ion beams in FY19 but also recognize the remaining challenges in providing a reliable operations-ready device, such as a gun high voltage power supply. Focused effort is needed to achieve the required stability for the LEReC injector laser system for BES-II runs. Progress also needs to be made in preventing current periodic discharge and beam trips in the electron gun at high average currents.
- The C-AD is commended for well-organized FY 2017 and FY 2018 funded accelerator research and development (R&D) efforts during a year-long activity period for a pre-conceptual design report for eRHIC. It is important that C-AD continue these focused R&D activities to further reduce technical risks for an electron ion collider (EIC).
- The Run 18 Coherent electron Cooling (CeC) proof of principle experiment came to an end without observing the expected observation of an “imprint” of the ion beam onto the FEL signal of the electron beam. Recently, it has been realized that the existence of high frequency noise in the electron beam could potentially mask the FEL signal produced by the overlapping hadron beam. The Laboratory should consider conducting an external technical review of the CeC experiment before any new plan is developed.

Closeout Bullets: One-Day Site Visit of the Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory (BNL)

September 18, 2018

- Clear progress has been made on the management of small projects both from setting up appropriate structures and in performance. A culture shift seems to be in progress. This item from the FY 2016 Science and Technology (S&T) review is now closed. Vigilance will be required to keep ongoing projects on track. The Office is looking forward to the continued refinement of these processes in the context of the recent delegation of authority of projects \$50 million and below to the laboratory.
- The inner Time Projection Chamber (iTTPC) is critical to the BES-II. We are encouraged that installation is on or ahead of schedule. Commissioning prior to and with beam will be important.
- Progress on sPHENIX is positive. There is concern that planned international investments may present challenges in the current environment and these risks should be evaluated.
- The long time to calibrate PHENIX Vertex (VTX) and Forward Vertex (FVTX) data from FY 2014 and FY 2016 are a concern and deserves attention that this not be delayed beyond current projections.