

**From the ALD's Desk**  
**RHIC News Bulletin Update**  
*September 2016*

The end of Run-16 has also marked the end of an era: Data taking with the PHENIX detector has come to a conclusion. PHENIX has been an extraordinarily successful experiment resulting in many unexpected discoveries, and we can still expect more from the analysis of the data that have been recorded in recent years. The collaboration can be proud of these achievements, which are second to no other experiment in the history of nuclear physics and have been made possible, to a significant extent, by the contributions made by the Japanese physics community and funding agencies.



*Andrich*

**RHIC Run-16:** The 23 cryo-week Run-16, which ended on July 1, included an 11 physics week Au+Au run at 200 GeV and a nearly 5 physics week beam energy scan for the d+Au system (200, 62.4, 39, and 19.6 GeV). Impressive efforts by C-AD staff enabled us to achieve nearly all goals in spite of a nearly 3-week shutdown necessitated by the failure of a diode in one of the blue ring magnets.

The Au+Au was again characterized by record-breaking machine performance including luminosity leveling or squeezing for an optimal match to the data taking capabilities of the detectors. PHENIX exceeded the integrated luminosity goals of the beam use request by 25 percent; STAR achieved 90, 103 and 120 percent of its goals for Upsilon, open charm and gamma-jet event selections, respectively. The d+Au run at four different energies also reached the aggressive goals set by the collaborations, which should provide enough statistics to permit measurements of elliptic flow at all energies and triangular flow at the two highest energies.

**PAC Meeting:** The RHIC Program Advisory Committee met on June 16-17, 2016 to discuss the Beam Use Request for the years 2017 and 2018 submitted by STAR. The PAC also heard presentations on the updated RHIC Cold QCD Plan and the report from the Chiral Magnetic Effect Task Force. For Run-17 the PAC assigned highest priority to a transversely polarized p+p run at 510 GeV addressing NP Milestone HP13 with an integrated luminosity goal of 400 pb<sup>-1</sup>. The PAC was also supportive of up to one week of running p+p at 510 GeV for the RHICf experiment, but viewed the proposed 62 GeV Au+Au run as low priority.

For Run-18 the PAC expressed strong support for the plan to collide two isobars (<sup>96</sup>Zr+<sup>96</sup>Zr and <sup>96</sup>Ru+<sup>96</sup>Ru) at 200 GeV as a critical test of the presence of Chiral Magnetic Effect contributions to the various observed charge separation effects. A

comparison of collisions in which the incoming charge differs, while fixing the number of incoming nucleons, allows one to isolate the effect of the generated magnetic field on the observed results. The goal was set to accumulate 1.2 billion minimum bias events for each system. DOE has assigned high priority to produce enough enriched  $^{96}\text{Ru}$  for the FY18 run at its new stable isotope enrichment facility, and we are optimistic that the material will be available in time for the run. The increased luminosity enabled by the enriched  $^{96}\text{Ru}$  will allow us to achieve the targeted number of collisions in shorter time. Depending on the duration of the necessarily short FY18 run (required by the iTPC and low-energy cooling upgrades), the PAC was also supportive of two weeks of 27 GeV Au+Au collisions, but encouraged STAR to further sharpen the physics case for such a run.

RHIC Users Meeting: The 2016 RHIC/AGS Users' Meeting was held June 7–10 at BNL with over 200 registered attendees. In addition to showcasing the latest science results obtained using the capabilities of the RHIC complex, this year's meeting incorporated a focus on diversity with presentations and panel discussions highlighting the circumstances of women and underrepresented minorities in nuclear physics and other STEM fields. Congratulations also to this year's thesis award winners, Joseph Duris (UCLA) and Arbin Timilsina (ISU).

RHIC Retreat: The annual RHIC Retreat was held at BNL on July 28-29, 2016. The retreat provided an opportunity by RHIC operations staff to assess the performance of the accelerator complex during the recently completed Run-16 and to discuss the planned activities during the shutdown before Run-17. These include extensive work on the low-energy electron cooling upgrade (LEReC) and the coherent electron cooling (CeC) proof-of-principle experiment.

Summer Sunday: This year's RHIC open house on July 31 drew more than 1300 members of the general public to see the RHIC tunnel and the STAR and PHENIX experiments up close. At the PHENIX experimental hall, people were treated to virtual reality tours of the detector, and they were able to see the internal workings of the real (non-virtual) drift chambers, laid open for the public for the first time.

RHIC Summer Interns: As every year, several students came to BNL from different locations with various backgrounds to spend part of the summer working with RHIC physicists and gaining training experience on a world class research project. By bringing their unbridled enthusiasm to BNL, these students are making significant contributions to various ongoing projects ranging from software improvements to the design of new detector components, and to outreach projects. Their contribution is widely appreciated by the RHIC physics community.

RHIC S&T Review: The biennial RHIC Science and Technology Review by DOE was held at BNL on August 23-25, 2016. The review team heard presentations on all aspects of the RHIC program including progress of the eRHIC R&D program. The panel praised the continued scientific productivity of RHIC: "The STAR and PHENIX experiments produce results at a very high rate. They are very productive and they

have a very large impact on important topics to both Hot and Cold QCD.” The panel recommended that BNL management should ensure readiness of detector operations after upgrades, make more systematic use of project management tools to small and medium upgrade projects, and conduct a comprehensive risk analysis of machine operations at beam intensities and luminosities exceeding RHIC’s original design specifications.

CME Task Force Report: The report of the Chiral Magnetic Effect Task Force led by Paul Sorensen and Vladimir Skokov is now available on the arXiv:1608.00982.

STAR iTPC Upgrade: DOE held a Technical, Cost, Schedule, and Management Review of the STAR iTPC project on September 13-14, 2016. The review panel recommended the development of a detailed plan for installation and commissioning that ensures readiness of the STAR detector during the 2019-20 Beam Energy Scan.

sPHENIX: The second sPHENIX Collaboration meeting was held at BNL on May 18–20, 2016 and the next is planned for December 15-17, 2016 at Georgia State University. sPHENIX calorimeter R&D made great progress with another round of test beam at FNAL - preliminary analyses indicate that the calorimeters meet the performance specifications needed to carry out the sPHENIX science program. Collaborators at LANL were awarded significant LDRD funding to prototype a near-copy of the ALICE MAPS (monolithic active pixel sensor) inner barrel for use in sPHENIX.

The sPHENIX Tracking System review took place September 7-8. The review panel confirmed that the sPHENIX physics goals are adequately addressed by the proposed tracking configuration. The panel also felt that cost and schedule estimates presented by the project team are reasonable for this early project stage, and that the plan can be realized in time for the detector to take data in 2022 if resources are available in a timely manner.

eRHIC R&D: Ferdinand Willeke, formerly head of operations of HERA and leader of the NSLS-II accelerator physics group at BNL, has been appointed as Director of eRHIC R&D and Design, effective August 2016. The C-AD design teams charged to develop low-risk versions of the ring-ring and linac-ring options presented outlines of their plans on July 11, 2016 to an ad-hoc advisory panel chaired by Mike Harrison. A summary of these plans was communicated to DOE-NP in early September.

EIC Users Group: The third meeting of the EIC Users Group was held at Argonne National Laboratory on July 7-9, 2016. For more information and to view the slides of presentations made at the meeting, visit <http://www.eicug.org>.