

**From the ALD's Desk**  
**A Quarterly RHIC News Bulletin**  
*December 2015*

Time flies. When I issued in August the first edition of a “monthly” news bulletin that communicates notable events around RHIC, a month seemed like a long time. It turned out not to be. Nonetheless, the desire by many members of the RHIC science community to receive regular updates on developments associated with RHIC remains. I hope that a more sustainable quarterly schedule will also help satisfy this communication need and that you will find this addition to your, now quarterly, reading list informative and useful.



*André Michalek*

2015 NSAC Long Range Plan: The new Long Range Plan was approved by NSAC on October 15 and transmitted to the agencies. The plan contains several recommendations relevant to RHIC. The first recommendation states that the highest priority in this 2015 Plan is to capitalize on the investments made since the 2007 Long Range Plan, including those made in RHIC: “The upgraded RHIC facility provides unique capabilities that must be utilized to explore the properties and phases of quark and gluon matter in the high temperatures of the early universe and to explore the spin structure of the proton.” In its accompanying language, the plan identifies a high statistics beam energy scan and the precision study of the microscopic properties of the quark-gluon plasma with jets and heavy quark bound states as priority areas of investigation.

The third recommendation firmly sets the field on a path, in which its long-term future in QCD research is seen to reside at an electron-ion collider: “We recommend a high-energy high-luminosity polarized Electron Ion Collider as the highest priority for new facility construction following the completion of FRIB.” In order to enable the technical progress required for the realization of this goal, the plan also recommends a R&D initiative: “Targeted detector and accelerator R&D for the search for neutrino-less double beta decay and for the Electron Ion Collider is critical to ensure that these exciting scientific opportunities can be fully realized.”

RHIC Run-16: The preparations for RHIC Run-16 are proceeding smoothly but slightly more slowly than originally planned, mainly because of our budget driven need to reduce overtime work before the end of the last fiscal year and postpone some purchases until the start of October. Although there are no major changes to either the accelerator or the detectors this year, the work that needs to be completed before cool-down for the installation of equipment required by the Coherent electron Cooling (CeC) experiment, which will be conducted in runs 16 and 17, and the Low Energy RHIC electron Cooling upgrade (LEReC), which must be completed before the end of 2018, is quite extensive.

The start of cool-down has therefore been delayed by two weeks until January 19, 2016. I apologize for the inconvenience this will cause to the collaborations due to the resulting changes to the shift schedules.

We are still planning for a 22 cryo-week run of RHIC, which focuses on a long Au+Au run at top RHIC energy and a beam energy scan for the d+Au system, contingent upon full funding of the FY2016 RHIC operations budget by Congress. A major goal of the Au+Au run will be the first measurement of charmed baryon ( $\Lambda_c$ ) production by STAR and improved statistics data for open charm and beauty meson production. A primary goal of the d+Au energy scan will be to study the beam energy dependence of quark-gluon plasma production in small systems.

STAR iTPC Upgrade: The STAR collaboration responded to PAC comments on its proposal for an upgrade to the inner sectors of the TPC by submitting an updated version that contains a strengthened and more focused science case. The upgrade will provide improved low momentum acceptance, momentum and  $dE/dx$  resolution, and extend the TPC's acceptance out to  $|\eta| \leq 1.5$ . Discussions about how the upgrade can be realized within the tight budget and time constraints – the iTPC upgrade must be completed in time for the planned next low energy run in 2019 – are ongoing.

CSWP Site Visits: The written reports from the site visits of the APS Committee on the Status of Women in Physics in June 2015 were received and are being discussed within the collaborations and with Laboratory management.

STAR Opportunities after 2020: The STAR Collaboration submitted an updated assessment of the physics opportunities for the STAR detector beyond 2020, which is publicly available at <https://drupal.star.bnl.gov/STAR/starnotes/public/sn0640>. The document was sent to the PAC for comments, which were conveyed to BNL management in a special PAC meeting held via videoconference on November 25. A detailed summary of these comments was provided to the collaboration.

The PAC emphasized the need to evaluate the proposed program and required additional investments in the light of the priorities set by the new Long Range Plan for Nuclear Science. There was a consensus among PAC members that the case for the proposed STAR upgrades was not sufficiently compelling at this time to pursue possible funding sources for them. Near and mid-term investments should be focused on the priority areas of the Long Range Plan, i.e. the second Beam Energy Scan, the jet and Upsilon measurements enabled by sPHENIX, and the planned 2017 RHIC spin run, while long-term efforts should be concentrated on the goal of a timely transition of the field to an electron-ion collider. The question of possible continued data taking by STAR after the completion of the beam energy scan in its then existing configuration should be revisited in the later part of this decade.

RHIC Spin Plan Update: A task force, led by Elke Aschenauer, was charged to develop the updated RHIC Spin Plan that was requested by the DOE Office of Nuclear Physics. The task force is charged with identifying key future cold QCD measurements that utilize

polarized p+p and p+A collisions at RHIC. In order to meet the January 31, 2016 deadline, the task force was asked to submit a preliminary draft of the updated Spin Plan to BNL by mid-December to allow for feedback from Lab management and senior experts in QCD spin physics.

First Collaboration meeting of the new detector collaboration: The process of formation of a new RHIC collaboration around the proposed detector for precision jet and Upsilon measurements (sPHENIX) is moving ahead. An inaugural collaboration meeting was held at Rutgers University on December 10-12, 2015, which approved the By-laws adopted by a committee led by Bill Zajc with minor modifications. Two candidates for co-spokesperson have been nominated and answered questions from the attendees. The spokesperson election will be held in early January 2016. The very well organized meeting benefited from the broad excitement about the opportunities opened up by the proposed new detector and featured many open and productive discussions.

sPHENIX pCDR: The preliminary conceptual design report for the RHIC new detector (sPHENIX) has been completed. The document is publicly available at <https://indico.bnl.gov/getFile.py/access?resId=0&materialId=11&confId=1483>.

sPHENIX Cost and Schedule Review: A Director's Review of the estimated construction cost and schedule of the new RHIC detector (sPHENIX) was held at BNL on November 9-10, 2015 at BNL in the presence of observers from the DOE Office of Nuclear Physics. The committee found the technical design to be well advanced and reasonably mature for a project at the pre-CD0 stage and that the presented cost and schedule estimates were credible, but recommended an increase in the contingency. The committee recommended that a postponement of first data taking by one year, to 2022, should be considered to allow for a less aggressive construction schedule. Overall, the review was positive and helped to identify the remaining challenges on the path to an official approval of the sPHENIX project.

eRHIC Planning: The eRHIC R&D Advisory Committee held its second meeting on November 19-20, 2015. The committee, chaired by Mike Harrison (BNL) and including both BNL and outside members, focused on the ongoing efforts of risk mitigation for the eRHIC design. The committee heard presentations describing the newly developed ring-ring option and the baseline design for the linac-ring option, both at stage-1 luminosity ( $10^{33}/\text{cm}^2\text{s}$ ). Thomas Roser and I had the opportunity to present an overview of the eRHIC R&D plans to the BSA Science and Technology Steering Committee in October and to the full BSA Board of Directors at its November meeting.