

June 25, 2025

Professor Abhay Deshpande
Associate Laboratory Director Nuclear and Particle Physics
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Dear Abhay,

The PAC wishes to thank you and BNL for your effective handling of the various issues associated with the start of RHIC Run 25. Your leadership and management, along with the C-AD's response, are to be commended for the efficient resolution of the unexpected RHIC machine issues that arose during the start of the run. The PAC also thanks you and BNL management for continued support in completing the data-taking necessary to achieve the longstanding goals of the RHIC Science Program.

Now that RHIC has achieved collisions and physics data-taking is underway, it is critical to focus on sustained RHIC operation to ensure successful completion of its scientific mission. As you and others highlighted in your presentations to the PAC, this will require RHIC to run through the summer as well as the fall. Doing so successfully will require the full support of the Lab in every aspect. We were therefore pleased to hear the various ways in which BNL is strongly committed to optimizing RHIC's success. This commitment is vital for this last RHIC run, a run that is a unique opportunity to fulfill the national nuclear science goals identified in the 2015 and 2023 NSAC Long Range Plans.

It is abundantly clear to the PAC and the nuclear physics community that the top priority for Run 25 is collecting the flagship Au+Au dataset that is the *raison d'être* for sPHENIX. This run will also enable STAR to complete its impactful program of Au+Au measurements using its suite of newly-upgraded detector systems.

As we noted in our November 2024 report, while the Au+Au run is essential to fulfilling the RHIC scientific mission, it alone is not sufficient. The PAC saw the pp, p+Au, and O+O runs proposed then as key elements necessary for addressing central, unresolved RHIC science questions in a decisive way. At this meeting, we also heard that STAR, motivated by their recent data analysis, intends to propose additional low-energy, fixed-target running to investigate possible critical point signatures. At the next meeting, the PAC looks forward to hearing from both sPHENIX and STAR regarding their best-informed prioritization of running other species or energies after the Au+Au run. The PAC will then formulate its recommendations on relative priorities, and articulate compelling scientific arguments needed to persuade higher-level decision-makers at BNL and at the DOE.

The PAC looks forward to successful data-taking in Run 25. Given the two-month delay caused by the machine incident, the next PAC meeting, scheduled for the September-October timeframe, will be crucial for evaluating RHIC's ability to deliver the integrated luminosity for sPHENIX and STAR to achieve their physics goals in calendar year 2025. Accordingly, preparations should be made for the possibility of extending operations into calendar year 2026. It is hoped that the need for this extension will become clear by the time of the next PAC meeting.

We look forward to a successful Run 25. Please let us know whether there is anything we can do to help make this a success.

Regards,

John Harris for the PAC