

## **sPHENIX heavy flavor physics prospects at RHIC**

sPHENIX is a cutting-edge experiment at the Relativistic Heavy Ion Collider (RHIC), focused on heavy-flavor and jet physics. Its design enables high-precision measurements in 200 GeV p+p and Au+Au collisions. The sPHENIX tracking system includes the Monolithic Active Pixel Sensor-based Vertex Detector (MVTX), Intermediate Silicon Tracker (INTT), Time Projection Chamber (TPC), and TPC outer tracker (TPOT), all operating together in a hybrid of full streaming (MVTX and INTT) and extended triggered readout mode (TPC and TPOT). Additionally, sPHENIX features a large-acceptance calorimeter system, which introduces the first barrel hadronic calorimeter at RHIC. This advanced system facilitates the exploration of Quark-Gluon Plasma (QGP) properties through high-statistics, unbiased data samples, including fully reconstructed heavy-flavor hadrons and jets with exceptional precision. In the 2024 run, sPHENIX has been fully commissioned, collecting 100 billion unbiased p+p collisions. In the 2025 run, sPHENIX plans to collect high statistics Au+Au collisions. In this talk, we will present the progress toward the first heavy-flavor physics results at sPHENIX, and performance projections for the entire heavy flavor physics program, especially the world leading b-physics program and the first measurement of  $\Lambda_c/D0$  in p+p collisions at RHIC.