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sPHENIX measurements of strange and heavy-flavor hadron production in p+p collisions

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The new sPHENIX collider detector experiment features a unique tracking system capable of streaming readout, enabling the collection of very large, unbiased p+p datasets previously not available at RHIC. In RHIC Run-24, sPHENIX recorded over 100 billion p+p collisions at 200 GeV in this readout scheme, and is collecting additional p+p data at the end of Run-25 with an even higher fraction of the luminosity in this mode. Using these datasets, qualitatively new measurements in both the strange and heavy-flavor (charm, bottom) sectors are feasible for the first time. For example, the transverse-momentum and multiplicity dependence of strange light hadrons can yield key insights about the onset of QGP formation. As the strange quark mass is below the critical temperature, they can be thermally produced inside the QGP. By measuring the relative production of Λ0 baryons to K0S mesons in p+p collisions, a key baseline measurement is performed, that when compared to later open heavy flavor measurements in various collision systems will enable sPHENIX to make quantitative statements on hadronization mechanisms such as comover effects and color reconnection. This talk will also report the progress of the first sPHENIX measurements in the open charm and bottom sectors in the Run-24 and Run-25 p+p collision datasets, which are ultimately expected to include reference cross-sections, ratios of identified yields for heavy flavor hadronization studies, and the multiplicity dependence of charm production.

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