# $\Lambda_c$ and $B^+$ production in Au+Au collision at $\sqrt{s_{NN}} = 200$ GeV for sPHENIX

Yuanjing Ji (for the sPHENIX Collaboration)
University of Science and Technology of China
Lawrence Berkeley National Laboratory

**Abstract**

Due to their large masses, heavy quarks ($c$,$b$) are regarded as unique probes to study the property of Quark-Gluon Plasma (QGP), a strong-coupled medium created in relativistic heavy-ion collisions. Recently, experimental results at RHIC and LHC show that the nuclear modification factors of open charm hadrons at high transverse momenta as well as their elliptic flow are similar to those of light flavor hadrons. Furthermore a strong enhancement of $\Lambda_c/D^0$ ratio compared to the fragmentation baseline has been observed in Au+Au, and also in p+p/Pb collisions. The $R_{AA}$ of bottom decay daughters at low $p_T$ seems to be less suppressed compared to light and charm hadrons. Precision measurements of charm baryon and open bottom production over a broad momentum range are needed for detail understanding of parton energy loss mechanisms and to characterize the transport properties of QGP.

sPHENIX is a planned next generation high-rate jet, Upsilon and open heavy-flavor detector at RHIC. A fast MAPS-based silicon vertex detector (MVTX) is proposed to greatly enhance the heavy flavor detection capabilities of sPHENIX. In this talk, we will present physics simulation studies of $\Lambda_c$ baryon and open bottom hadron measurements in Au+Au collisions at $\sqrt{s_{\rm NN}} = 200\,\text{GeV}$ with the full sPHENIX tracking environment including the MVTX detector. The simulation method for estimating the expected signal and background entries will be discussed. Statistical projections of open bottom nuclear modification factor and elliptic flow as well as the $\Lambda_c/D^0$ ratio will be presented.