

# Energy and System Dependent Heavy Flavor Measurements at PHENIX at RHIC

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Heavy flavor and quarkonium production are important hard probes to test Quantum Chromodynamics (QCD) and measure the properties of the Quark Gluon Plasma (QGP) created in high energy heavy ion collisions. Unlike LHC experiments, heavy flavor production at RHIC has its unique kinematic region and different production mechanisms. The PHENIX experiment has collected large data sets of 200/510 GeV  $p+p$ ; 200 GeV  $p+Al$ ,  $p+Au$ ,  $Cu+Au$  and  $Au+Au$  collisions, which allow us to study the energy dependence of the heavy flavor production, the heavy quark energy loss in cold nuclear medium and hot QGP. In this talk, we will present latest PHENIX hidden and open heavy flavor results in different collision systems including the  $J/\psi$  cross section and nuclear modification factor ( $R_{AA}$ ) in 200 GeV  $p+Al$ ,  $p+Au$  and  $^3He+Au$  data to study the cold nuclear medium effects on the charm quark production; the energy dependent production of forward  $J/\psi$  from B meson decay and bottom cross section measured in  $p+p$  collisions which improves the understanding of the heavy flavor production mechanism; the non-prompt  $J/\psi$  nuclear modification factor measurement in  $Cu+Au$  collisions at  $\sqrt{s_{NN}} = 200$  GeV and the charm and bottom decayed single electron nuclear modification factor measurements in 200 GeV  $Au+Au$  collisions. We will also show the prospects for ongoing PHENIX central and forward rapidity open heavy flavor measurements in 200 GeV  $Au+Au$  collisions.

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PHENIX

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