

Electromagnetic Probes and Heavy Flavor - Recent Results from the PHENIX Experiment at RHIC

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Abstract

Electromagnetic Probes play a unique role in relativistic heavy ion collisions since they interact only electromagnetically, thus carrying the information about their production stage directly to the detector. The PHENIX experiment at RHIC has measured electron-positron pairs from $p + p$ and $Au + Au$ collisions. The results show an enhanced yield in the low mass region of the di-electron continuum in central $Au + Au$ collisions, which is much larger than predicted by the models. In the recent years, PHENIX has also measured the invariant yield and azimuthal anisotropy of electrons from non-photon sources and prompt muons, that are produced by the semi-leptonic decays of D and B mesons. Complementary to single lepton measurements, PHENIX has measured the invariant yield, azimuthal anisotropy and polarization of various quarkonia states. These measurements provide important insight into heavy flavor production mechanisms.

This talk will summarize the di-electron spectrum measured in $p + p$, $Cu + Cu$ and $Au + Au$ collisions at $\sqrt{s_{NN}} = 200$ GeV. A comparison to the expectations from hadronic sources as measured by PHENIX and various model predictions will also be shown. We will present an overview of the latest PHENIX results on open heavy flavor and quarkonia production, measured through electron and muon channel at mid-rapidity and forward/backward rapidity for $p + p$, $d + Au$ and $Au + Au$ collisions.