

Heavy Flavor and Strangeness Measurements at the PHENIX Experiment

Marzia Rosati for the PHENIX Collaboration^a

^a Iowa State University
mrosati@iastate.edu

The PHENIX experiment at RHIC was designed with a broad physics program in mind and is capable of measuring leptons, photons and hadrons with excellent energy and momentum resolution. PHENIX has unique capabilities to measure both the leptonic and hadronic decay modes of the particles produced in the collisions. That allows the most comprehensive study of light vector mesons, open heavy flavor and heavy quarkonia.

Light vector mesons, like the ϕ , are considered as a sensitive probe of partial chiral symmetry restoration and as a signature of the deconfined partonic state of matter. Measurement of the ϕ nuclear modification factor and the comparison of the branching fraction in the di-electron to hadronic decay channels provide information on the strangeness content in the events and an insight into the chiral symmetry restoration expected at high temperatures in heavy ion collisions.

Hadrons carrying heavy quarks (charm and bottom) are important probes in hadronic collisions. Heavy quarks are produced in the initial hard scattering partonic processes and hadronize into quarkonia and particles carrying open heavy flavor. Heavy quark production rates in p+p collisions can be calculated reliably by perturbative QCD and therefore provide a fundamental testing ground for QCD. Comparative measurements of p+p, d+Au and Au+Au are sensitive to the initial state gluon densities in these systems. In addition, open heavy flavor production probes the hot and dense medium created in heavy ion collisions via the simultaneous measurement of azimuthal anisotropy and nuclear modification factor.

Heavy quarkonia production and its nuclear modification factor are sensitive to the deconfined medium of the QGP through color screening, but may also include substantial contributions from regeneration due to the large number of charm quarks created in the same heavy-ion collisions that create the QGP.

This talk will review the latest PHENIX measurements of strangeness, open heavy flavor and quarkonia production.