Stony Brook University
The Graduate School

Doctoral Defense Announcement

Abstract

Single Electrons from Decays of Heavy Quarks Produced in Cu+Cu Collisions at the Relativistic Heavy Ion Collider (RHIC).

By

Nicole Apadula

The PHENIX experiment at the Relativistic Heavy Ion Collider (RHIC) has measured charm and bottom quark production at mid-rapidity in p+p, d+Au, and Au+Au collisions at $\sqrt{s}$ = 200GeV through their semi-leptonic decay into electrons. The large mass of the charm and bottom quarks means they are formed predominately by gluon-gluon fusion in the initial hard scatterings at RHIC and thus experience the full evolution of the medium, making them a good probe of medium effects.

The yield in central Au+Au collisions is suppressed relative to p+p collisions, suggesting that the heavy quarks lose a significant portion of their initial energy in the medium. The d+Au results are enhanced relative to the p+p, pointing to cold nuclear matter effects that are masked by the hot medium in the Au+Au collisions. Studies of the intermediately sized Cu+Cu system provide a way to explore these competing effects as a function of system size and number of participating nucleons.

In this dissertation, measurements of electrons from the decays of heavy quarks produced in Cu+Cu collisions are presented. We examine the interplay between hot and cold nuclear matter effects on open heavy flavor by comparing the results to those already measured in Au+Au and d+Au. It has already been shown in the central Au+Au that partonic energy loss models are insufficient to describe the level of suppression. New models that include cold nuclear matter effects and the addition of meson dissociation are shown and compared to the Cu+Cu results.

Date: April 25, 2013
Time: 1pm
Place: Physics, C120

Program: Physics
Dissertation Advisor: Axel Drees