Heavy quark nuclear modification at forward rapidity in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV

CEsar Luiz da Silva, PHENIX Collaboration
Los Alamos National Lab

**Forward Heavy Flavor in A+A collisions**

- Explore a distinct kinematic region from mid-rapidity measurements
- Large and unexpected initial state effects already observed in $d+Au$ collisions
- Main production mechanism is pair creation and flavor excitation, in contrast with LHC where gluon splitting dominates
- Heavy flavor is expected to be largely affected by initial magnetic fields, effect is amplified at large rapidities

**The PHENIX Muon Arms**

- Two-arm spectrometers covering $1.2 < |\eta| < 2.2$
- From the Interaction Point
  - Central and Forward Vertex Detector (FVTX)
  - 7.2 nuclear interaction lengths hadron absorber and magnet between FVTX and MuTr
  - MuTr drift chambers inside $\int |B \cdot dl| = 0.72$ T m magnetic field
  - MuD with farocci tube planes embedded in 4.8-5.4 nuclear interaction lengths hadron absorbers

**Identifying hadrons from charm and bottom quarks**

<table>
<thead>
<tr>
<th>DCA$_p$</th>
<th>Signal/(mismatch background) ranges from 1/3.5 to 3 from low to high $p_T$ muons.</th>
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<tbody>
<tr>
<td>DCA$_p$</td>
<td>Depends on: event-by-event vertex resolution, distance between vertex and FVTX, momentum and rapidity of the particle, track and matching quality, decay length of the particle.</td>
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<td>Shape scales are simultaneously fitted to the measure BDT for particles stopping in the MuID and muons which penetrate all MuID gaps.</td>
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<td>Validation checks found correct charm and bottom contribution in pseudo data with different compositions of charm, bottom, kaon, pion and prompt decays.</td>
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**Status of the Analysis and Perspectives**

- Waiting to accumulate statistics in detector simulations for light hadrons, these simulations are slow because of the large hadron rejection in the absorbers (a factor of $\sim 1/100$).
- Data driven techniques to validate DCA$_p$ shapes from simulation have been studied.
- Expect $R_{AA}$ of separated $c, b \rightarrow \mu$ covering at least $2 > p_T(\text{GeV}/c) > 5$.
- Smaller $p_T$ B-mesons expected to be obtained from non-prompt $J/\psi$s.