Production of non-photonic electrons in central U+U collisions

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Abstract
Since year 2000 the properties of Quark-Gluon Plasma (QGP) are being studied in ultrarelativistic heavy-ion collisions at the Relativistic Heavy Ion Collider (RHIC). Heavy quarks are created during early stages of a heavy-ion collision in hard processes before the system reaches thermal equilibrium and the QGP is formed. Their production is not affected by the QGP phase, which makes them a good probe for the study of the properties of hot and dense strongly interacting medium. Non-Photonic Electrons (NPE) that originate dominantly from semileptonic decays of D and B mesons can serve as a good proxy for heavy flavor quarks. In this poster the preliminary measurement of NPE in 0-5% most central U+U collisions at √sNN = 193 GeV is presented for the transverse momentum range of 1.2 < pT < 6.0 GeV/c. The nuclear modification factor shows a strong suppression for pT > 3 GeV/c, similar to results in central Au+Au collisions.

1. Detector layout
The Solenoidal Tracker at RHIC (STAR) covers 2π in azimuth and two units of pseudorapidity around mid-rapidity. It is enclosed inside a solenoidal magnet, which has a field strength of 0.5 T.

2. Motivation

- Uranium nuclei have higher number of nucleons compared to gold nuclei
- By colliding uranium nuclei it is possible to achieve up to 20% larger energy density than Au+Au collisions [1]
- Larger suppression of non-photonic electrons in uranium collisions is expected in comparison to gold nuclei at the same centrality class

3. Methods

- Non-photonic electrons originate from semileptonic decays of open heavy flavor hadrons: D → X + e, B → X + e, etc.
- Photonic background mainly from γ conversion and π0 Dalitz decays has to be subtracted

4. Results

- First result on RAA of non-photonic electrons in 0-5% most central U+U collisions obtained at 1.2 < pT < 6.0 GeV/c (Fig. 6)
- RAA consistent with no suppression for pT < 2 GeV/c
- Large suppression is observed at high transverse momenta, for pT > 3 GeV/c
- RAA of NPE in U+U collisions is systematically lower than RAA in Au+Au collisions but consistent within uncertainties

5. Conclusions
A strong suppression of non-photonic electrons is observed in 0-5% most central U+U collisions at high transverse momenta pT > 3 GeV/c. The nuclear modification factor in U+U collisions is consistent within errors but systematically lower than suppression of NPE in Au+Au collisions at similar centrality. RAA of U+U collisions extends the trend of RAA vs. number of participants in Au+Au collisions.

6. References and acknowledgements
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