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## Effect of nuclear structure on particle production in heavy-ion collisions using the AMPT model

Wednesday, July 12, 2023 4:00 PM (20 minutes)

One of the primary goals of studying heavy-ion collisions has been to comprehend a medium of de-confined quarks and gluons called Quark-Gluon Plasma (QGP). Various nuclei, like Cu, Au, Pb, and U, have been collided in various relativistic heavy-ion colliders to decipher the properties of this medium and the corresponding particle production in these collisions. All these nuclei are observed to have various shapes and structures, which might also influence particle production. Recently, the STAR experiment at RHIC recorded data for isobar, Ru+Ru, and Zr+Zr, collisions at  $\sqrt{s_{NN}} = 200$  GeV, provide hints of different nuclear structure between the two isobar nuclei through collective flow. These nuclei can be modeled using different configurations of Woods-Saxon (WS) distribution using the AMPT model and study the influence of nuclear geometry on the particle production mechanisms.

In this talk, we will present transverse momentum ( $p_T$ ) spectra of pions, kaons, and (anti-)protons at mid-rapidity ( $|y| < 1.0$ ) for Ru+Ru, Zr+Zr, Au+Au and U+U collisions at  $\sqrt{s_{NN}} = 200$  GeV using a multi-phase transport (AMPT) model. The effect of various parameterizations of WS distribution on  $p_T$ -spectra, particle yield ( $dN/dy$ ), mean transverse momentum ( $\langle p_T \rangle$ ), and particle ratios will be discussed. The system size dependence of  $dN/dy$  and  $\langle p_T \rangle$  with different colliding systems will be presented. In addition, the physics implications of such studies in the context of nuclear structure in isobars will be highlighted.

### Is this abstract from experiment?

No

### Name of experiment and experimental site

NA

### Is the speaker for that presentation defined?

Yes

### Details

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### Internet talk

Yes

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