Contribution ID: **19** Type: **Oral**

Probing the initial state and evolution of isobaric systems in relativistic nuclear collisions

Friday 5 September 2025 16:00 (15 minutes)

We investigate isobaric collisions (Ru+Ru and Zr+Zr) at RHIC to study how nuclear structure influences the initial conditions and the subsequent evolution of the quark-gluon plasma (QGP). Though identical in mass number, the nuclei differ in proton number and structure, Ru is expected to have a quadrupole deformation, while Zr exhibits octupole features. These differences result in distinct initial energy density distributions and spatial eccentricities, which manifest into qualitative and quantitative differences in the final-state observables such as anisotropic flow coefficients.

Electromagnetic probes, particularly thermal photons, offer direct access to the early stages of the medium evolution. Photons are emitted throughout the lifetime of the system and largely unaffected by final state interactions. Thus, they are considered as highly sensitive to investigate the initial geometry. A comparative analysis of electromagnetic and hadronic observables in isobaric collisions can thus provide critical insights into the initial conditions, QGP dynamics, and the influence of nuclear structure on the dynamics of heavy-ion collisions.

Author: PAUL, Amit (Variable Energy Cyclotron Centre (VECC), Kolkata)

Co-author: CHATTERJEE, Rupa

Presenter: PAUL, Amit (Variable Energy Cyclotron Centre (VECC), Kolkata)

Session Classification: Parallel Session