Probing the system-size dependence of parton energy loss in heavy-ion collisions with the STAR detector

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High transverse momentum partons are produced in hard-scattering processes during the initial stages of high energy nucleus-nucleus collisions and lose energy as they interact with the hot dense medium via collisional and radiative processes. Partonic energy loss can be investigated through the study of high transverse momentum particles and jets. While previous measurements have investigated its dependence with the collision energy, we present results that target the sensitivity of parton energy loss to the collision system size.

In 2018 STAR recorded a large dataset of the isobars (3.1B events for each species), Ru+Ru and Zr+Zr collisions, at $\sqrt{s_{\mathrm{NN}}} = 200\,\mathrm{GeV}$. This dataset provides a unique opportunity to further explore how the properties of the QGP are affected by the number of participating nucleons and the nucleus shape versus the medium's initial energy density. We explore traditional jet quenching observables in these collision systems where accumulated statistics will allow to investigate parton energy loss in details and compare to similar measurements in Au+Au collisions.