Semi-inclusive hadron+jet and inclusive jet yield measurements in O+O collisions at $\sqrt{s_{NN}}$= 200 GeV at RHIC-STAR

Sijie Zhang for the STAR Collaboration
Shandong University

Studying the quark-gluon plasma (QGP), a novel state of matter made of deconfined quarks and gluons, is essential for understanding the early universe. Jet quenching, modifications to the energy and substructure of high-energy parton showers in the QGP, serves as a key experimental tool to probe QGP's properties in relativistic heavy-ion collisions. Although the jet quenching phenomenon has been well established in large collision systems, such as Au+Au and Pb+Pb collisions, it is absent in smaller p+A collisions, either because the medium is not formed, or its temperature or lifetime is too low to cause jets to lose much energy. This highlights the need for studying its system size dependence, and the O+O collisions delivered by RHIC at $\sqrt{s_{NN}}$ = 200 GeV bridge the gap between these small and large systems. In this talk, we present the first measurement of jet yield in 200 GeV O+O collisions, utilizing both inclusive jet and semi-inclusive hadron+jet, where the latter only selects events with a trigger hadron. By applying the event mixing technique, picking a random track from each event for the mixed event, we can remove combinatorial background and isolate the jet signal. These results will be compared to similar measurements in collision systems of various sizes, providing valuable insight into how the system size affects the QGP properties.