

Tracking the baryon quantum number in Ru+Ru and Zr+Zr collisions at $\sqrt{s_{\text{NN}}} = 200$ GeV with the STAR experiment

Yang Li, for the STAR Collaboration

University of Science and Technology of China

Brookhaven National Laboratory

1 In QCD, the baryon number is a conserved quantity that is conventionally
2 assumed to be distributed evenly among valence quarks. An alternative the-
3 ory suggests that the baryon number may be carried by a non-perturbative
4 topology of gluons, known as the baryon junction, which has a different dis-
5 tribution than valence quarks. Since the charge is carried by the quarks,
6 the theory can be tested by examining the net-baryon (B_{net}) and net-charge
7 (C_{net}) produced in heavy-ion collisions. The dataset of Ru+Ru and Zr+Zr
8 at $\sqrt{s_{\text{NN}}} = 200$ GeV presents a good opportunity for such a test. The ratio of
9 B_{net} and the net-charge difference (ΔC_{net}) between the two isobaric collisions
10 is found to be approximately twice the ratio of mass number to atomic num-
11 ber differences (96/4) in central events, which supports the baryon junction
12 hypothesis.