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Measurements of Baryon-to-Meson Ratios Inside Jets in Au+Au and p+p Collisions at $\sqrt{s_{NN}} = 200$ GeV at STAR

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Measurements at RHIC and the LHC show strongly enhanced inclusive hadron baryon-to-meson yield ratios at intermediate transverse momenta (p_{T}) in high-energy nuclear collisions compared to p+p baseline. This enhancement is attributed to strong hydrodynamic flow and parton recombination in the Quark-Gluon Plasma (QGP). Jet probes have been used extensively to gain insights into QGP properties, with substantial modifications to jet yields and internal structures seen across multiple measurements. Despite apparent medium-induced changes to jet fragmentation patterns, the LHC results indicate that in-jet baryon-to-meson ratios remain similar to that of p+p measurements and are significantly different from that of the QGP bulk. To explore this behavior with the STAR detector at RHIC, we employ jet-hadron correlation and particle identification to measure in-cone baryon-to-meson yield ratios associated with fully reconstructed jets from Au+Au and p+p collisions at $\sqrt{s_{\mathrm{NN}}} = 200$ GeV. These in-jet ratios are studied as a function of jet radii, R $= 0.2, 0.3, 0.4$, and jet constituent p_{T} selections, $p_{\mathrm{T}}^{\mathrm{const}} > 2.0$ GeV/c, 3.0 GeV/c. Varying the jet radius and constituent p_{T} selection allows us to probe jets with different levels of QGP interaction. The in-jet baryon-to-meson ratios are compared between Au+Au and p+p to examine what effect the presence of QGP has on the hadronization process in jets.

Category

Experiment

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STAR

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