Method of semi-inclusive jet mass measurement in Au+Au collisions at $\sqrt{s_{\mathrm{NN}}} = 200$ GeV with STAR

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Jet quenching phenomenon serves as a crucial signature of the Quark-Gluon Plasma, observed when hard-scattered partons interact with the hot, dense QCD medium created in high-energy heavy-ion collisions. In central heavy-ion collisions, however, distinguishing jets produced by hard scattering from those originating from combinatorial background is largely limited, especially for jets with low transverse momenta ($p_{\mathrm{T,jet}}$). To address this challenge, methods for measurements of semi-inclusive recoil jets with respect to a trigger particle have been devised, leading to measurements of jet yields to the unprecedentedly low $p_{\mathrm{T,jet}}$ range. In particular, the STAR Collaboration has combined this semi-inclusive recoil jets measurement with a mixed-event technique as a data-driven method for the correction of uncorrelated background effects. We aim to extend the scope of the semi-inclusive approach into measurements of jet mass (M_{jet}), and develop a 2-dimensional correction framework as a function of ($p_{\mathrm{T,jet}}, M_{\mathrm{jet}}$).

In this poster, we discuss the method of semi-inclusive jet mass measurements, and provide the closure test result based on simulation. Jets from PYTHIA events are embedded into $\sqrt{s_{\mathrm{NN}}} = 200$ GeV Au+Au collision background obtained from a thermal model. Correction procedures, including the subtraction of combinatorial jet contributions via a mixed-event technique and 2-dimensional unfolding, are tested.