Measurement of inclusive jet production in Au+Au collisions at $\sqrt{s_{\rm NN}} = 200$ GeV by the STAR experiment

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The STAR Collaboration reports the measurements of both charged-particle and fully-reconstructed inclusive jet production in central (0-10%) and peripheral (60-80%) Au+Au collisions at $\sqrt{s_{\rm NN}} = 200$ GeV. The charged-particle jet analysis utilizes a dataset corresponding to 70 μb^{-1} recorded in 2011 using a Minimum Bias trigger, while the new fully-reconstructed jet analysis utilizes a dataset corresponding to 5.2 nb^{-1} recorded in 2014 using a calorimeter trigger. Charged-particle jets are reconstructed using only charged-particle tracks in the Time Projection Chamber with transverse momentum ($p_{\rm T}$) larger than 0.2 GeV/c, while neutral energy, measured by the Barrel Electromagnetic Calorimeter, with transverse energy larger than 0.2 GeV is additionally used for the fully-reconstructed jets. Jet reconstruction is carried out using the anti-$k_{\rm T}$ algorithm with resolution parameters $R = 0.2$, 0.3, and 0.4. Effects of the large background in heavy-ion collisions are suppressed by requiring high-$p_{\rm T}$ leading charged or neutral radiation in accepted jet candidates. The bias imposed by this requirement is assessed, and the $p_{\rm T}$-region in which this bias is negligible is identified. Inclusive jet distributions are reported in central and peripheral Au+Au collisions for $p_{\rm T}^{jet} > 10$ GeV/c. Yield suppression, corresponding to medium-induced parton energy loss, is observed for central Au+Au collisions relative to both peripheral Au+Au collisions and vacuum reference. Medium-induced jet broadening is measured using the R-dependence of jet yields. The results are compared to jet measurements at the LHC and theoretical calculations.