

Looking for Mach cones in QGP using deep learning

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Mach cones are expected to form in the expanding quark-gluon plasma (QGP) when energetic quarks and gluons (called jets) traverse the hot medium at a velocity faster than the speed of sound in high-energy heavy-ion collisions. The shape of the Mach cone and the associated diffusion wake are sensitive to the initial jet production location and the jet propagation direction relative to the radial flow because of the distortion by the collective expansion of the QGP and large density gradient. We develop a deep learning assisted jet tomography which uses the full information of the final hadrons from jets to localize the initial jet production positions. This method can help to constrain the initial regions of jet production in heavy-ion collisions and enable a differential study of Mach-cones with different jet path length and orientation relative to the radial flow of the QGP in heavy-ion collisions.

Theory / experiment

Theory

Group or collaboration name

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