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Measurement of jet quenching cone-size dependence in pp and Pb–Pb collisions with ALICE

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Heavy ion collisions serve as an excellent testing ground to study the strong interaction, described by quantum chromodynamics, under extremely high temperatures. In that environment, a short-lived medium of deconfined matter, called the quark-gluon plasma (QGP), is formed. A hard scattering between partons from the incident nuclei can result in the production of highly energetic partons that will shower into collimated spays of soft particles. These physical objects, called jets, constitute excellent probes for the study of the QGP in heavy ion collisions. In particular, jet substructure measurements can help us understand the interaction dynamics of high-energy partons with the QGP. The effects of these interactions are commonly referred to as jet quenching. In this talk, we discuss two observables which investigate the dependence of jet quenching on the resolution parameter R_{jet}. First, we present a new measurement of the nuclear modification factor R_{AA} using novel machine learning techniques to address the influence of the underlying event in heavy ion collisions. In addition, we introduce a new infrared and collinear safe measurement of the energy flow within jets reconstructed with different resolution parameters R_{jet}. These measurements gauge the relative contribution of competing energy-loss effects such as the dependence on the opening angle of the shower and the generation of large-angle fragments by radiative energy loss, which give opposite trends for the R_{jet}-dependence of R_{AA}.

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