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Jet acoplanarity and energy flow within jets in Pb-Pb and pp collisions with ALICE

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Jets are excellent probes for the study of the deconfined matter formed in heavy ion collisions. We present measurements of the semi-inclusive distribution of charged-particle jets recoiling from a high-pT trigger hadron in pp and central Pb–Pb collisions at $\sqrt{s_{\rm NN}}$ = 5.02 TeV. We compare the semi-inclusive recoil jet yields in pp and Pb-Pb collisions over a broad $p_{\rm T}$ jet range, which probes energy loss due to jet quenching. We report the first measurement of hadron-jet acoplanarity in pp collisions. The comparison of acoplanarity measurements in pp and Pb-Pb collisions at low $p_{\rm T}$ jet gives unique and incisive exploration of medium-induced jet deflection. The measurements are compared to theoretical calculations based on pQCD, and to models incorporating jet quenching.

The jet substructure measurements can also help us understand the interaction dynamics of high-energy partons with the quark-gluon plasma. We present two new infrared and collinear safe observables: the angle between different definitions of the jet axis, $\Delta R_{\rm axis}$, as well as jet energy flow measurements using jets reconstructed with different resolution parameters R. Both the jet energy flow and $\Delta R_{\rm axis}$ measurements can help us gauge the comparative strength of competing energy loss mechanisms in a heavy ion environment. The first measurement of the $\Delta R_{\rm axis}$ observable, both in pp and Pb-Pb, are presented and discussed in the context of event generators and analytic calculations. A new measurement of jet energy flow in pp collision data is compared to prediction of various pp event generators. A study of the sensitivity of this observable to energy loss effects in Pb-Pb collisions with the JEWEL event generator will also be presented.

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