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New results on inclusive and reaction plane dependent dijet asymmetry in Pb+Pb collisions with ATLAS

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The phenomenon of events containing highly asymmetric dijet pairs is one of the most striking results in heavy ion physics. It has provided the first direct observation of in-medium jet energy loss at the LHC. Detailed measurements of centrality-dependent dijet imbalance in $\sqrt{s_{NN}} = 2.76$ TeV PbPb collisions using data collected in the 2011 LHC heavy ion run are presented. The new analysis fully corrects to the particle level. The results show a centrality-dependent modification of the dijet asymmetry distribution accompanied by an unmodified angular correlation between two jets in the dijet system. Detailed studies of the dijet asymmetry as a function of the leading jet transverse momentum and jet radius are presented. The reference measurement of the dijet asymmetry in the pp collisions at the same center of mass energy is also shown. The dijet asymmetry measurements are also done while selecting the leading jet at different angles with respect to the second order event-plane. This effectively probes the path-length dependence of the dijet asymmetry at fixed centrality. The variation of the dijet asymmetry with the soft particle v_2 , at fixed centrality are also measured. To further constrain the energy loss models, the measurement of the correlations between jets that are at small relative angles was performed. The measured neighbouring jet pairs result primarily from hard radiation by the parton that occurs early in the process of the shower formation. These dijet and multijet measurements can provide a better understanding of the correlation of the parton energy-loss with the underlying geometry, help elucidating the role of the fluctuations in the energy loss as well as put some constraints to models in which a part of the parton shower radiates coherently in the response of the medium.

On behalf of collaboration:

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