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Observation of Long-Range, Near-Side Angular Correlations in Proton-Proton Collisions at the LHC

Content :

Results on two-particle angular correlations for charged particles emitted in proton-proton collisions at center-of-mass energies of 0.9, 2.36, and 7 TeV are presented, using data collected with the CMS detector over a broad range of pseudorapidity (eta) and azimuthal angle (phi). Short-range correlations in Delta_eta, which are studied in minimum bias events, are characterized using a simple "independent cluster" parametrization in order to quantify their strength (cluster size) and their extent in eta (cluster decay width). Long-range azimuthal correlations are studied differentially as a function of charged particle multiplicity and particle transverse momentum using a 980 inverse nb data set at 7 TeV. In high multiplicity events, a pronounced structure emerges in the two-dimensional correlation function for particle pairs with intermediate transverse momentum of 1-3 GeV/c, 2.0 < |Delta_eta| < 4.8 and Delta_phi ~ 0. This is the first observation of such a long-range, near-side feature in two-particle correlation functions in pp or pp collisions.

Collaboration :

CMS

Primary authors : Prof. SEIXAS, Joao (LIP Lisbon and IST Lisbon)

Co-authors :

Presenter : Prof. SEIXAS, Joao (LIP Lisbon and IST Lisbon)

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