



ID de Contribution: 5

Type: **Non sp cifi **

Femtoscopic correlations at LHCb

lundi 4 novembre 2024 10:45 (25 minutes)

A study of the Bose–Einstein correlations for same-sign charged pions originating from proton-proton and proton-lead collisions recorded in the LHCb experiment at $\sqrt{s} = 7$ TeV centre-of-mass energy and $\sqrt{s_{NN}} = 5.02$ TeV centre-of-mass energy per nucleon will be presented. Both measurements are the first of this type performed in the forward region at LHC energies and are complementary to studies from other experiments at the LHC in the central rapidity region. In particular, the measured correlation radii scale linearly with a cube root of the reconstructed charged-particle multiplicity, which is a tendency compatible with predictions of hydrodynamic models on the system evolution. The pPb system is investigated both in the forward and the backward direction due to asymmetric beams and hints for a potential sensitivity of the correlation radii to pseudorapidity are observed. The preliminary results on three-pion Bose-Einstein correlations measured with the sample of proton-proton collisions recorded at the centre-of-mass energy of $\sqrt{s} = 7$ TeV will also be presented, being the first study of three-particle Bose-Einstein correlations measured in the forward region provided by the LHCb detector. The results are interpreted within the core-halo model for the first time in proton-proton collisions.

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