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Measurement of forward-backward multiplicity and flow correlations in pp, p+Pb and Pb+Pb collisions with the ATLAS detector

Thursday, 26 May 2016 17:00 (30 minutes)

(speaker known later)
Correlations between particle multiplicities at different pseudorapidities
are studied in pp, p+Pb and Pb+Pb collisions using the ATLAS detector at the LHC. A data driven procedure is used
to separate the short-range and long-range contributions to the correlation function.
The short-range component differs considerably between opposite and same charged pairs
and shows a strong collision system dependence. The long-range component is expanded
in an orthogonal basis of Legendre polynomials, and is found to be dominated by the
first order (linear) modulation. The coefficient of the first order modulation, a_1,
is studied as a function of the event-multiplicity. It is found to be independent of
the charge combination of the pair, and similar between the three collision systems at a
given multiplicity. The a_1 is known to be strongly correlated with the forward-backward
asymmetry in the initial state. The multiplicity and collision system dependence of a_1
can provide important insights into the early time entropy production in high
energy collisions.

Measurements of the azimuthal anisotropy of charged particles in Pb+Pb, p+Pb and pp
collisions over broad transverse momentum and pseudorapidity ranges, using the ATLAS detector
are presented. The measurements are done via multi-particle cumulants, event-plane and
scalar-product methods. The analysis uses high-statistics p+Pb data at
$\sqrt{s_{\rm NN}}$=5.02˜TeV, pp data at $\sqrt{s}$=13˜TeV and Pb+Pb data
at $\sqrt{s_{\rm NN}}$=2.76˜TeV. The measurements for different systems are compared
as a function of charge particle multiplicity. In addition, the measurements of flow harmonics, v_n,
in the new 5.02˜TeV Pb+Pb data collected during the 2015 LHC heavy-ion run, will be reported.
This study provides important insight into the potential collective behavior in small collision systems.

Collaboration

ATLAS

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Session Classification: Extraction of medium properties