

Studying collectivity in small collision systems with multi-particle azimuthal correlations with the ATLAS detector

ATLAS measurements of multi-particle azimuthal correlations for produced charged particles in small collision systems (5.02 and 13 TeV pp , 5.02 TeV p +Pb and low-multiplicity 2.76 TeV Pb+Pb collisions) are presented. The correlations are expressed in terms of cumulants c_n , which can be directly related to Fourier harmonics v_n . A comparison across different collision systems is presented as a function of the charged particle multiplicity N_{ch} . These measurements aim to assess the collective nature of multi-particle production. While collectivity is well established in p +Pb and Pb+Pb collisions, its evidence in pp collisions is still a matter of debate. The presented measurements of multi-particle cumulants $c_2\{2-8\}$ confirm the evidence for collective phenomena in p +Pb and low-multiplicity PbPb collisions. For pp collisions the same conclusion can be derived from two-particle cumulants calculated with the requirement of a large pseudorapidity separation, $|\Delta\eta| > 2$. However, the measurements of $c_4\{4\}$ cumulants with a method that is not susceptible to event-by-event multiplicity fluctuations, but is biased by higher order non-flow correlations, do not yet provide clear evidence for collectivity. A modified cumulant method is used to suppress both the contribution of multiplicity fluctuation and non-flow effects. The results from this method are presented for pp and p +Pb collisions.

Preferred Track

QCD in small systems

Collaboration

ATLAS

Primary author: BEHERA, Arabinda (State University of New York (US))

Presenter: BEHERA, Arabinda (State University of New York (US))

Session Classification: Poster Session