Contribution ID: **251** Type: **Experimental poster**

Probe pT-dependent flow vector fluctuations with ALICE

Thursday, 28 May 2020 18:45 (1 hour)

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One of the main goals of ultra-relativistic nuclear collisions is to create a
new state of matter called quark-gluon plasma (QGP) and study its properties. One of the experimental observables is the anisotropic flow vn, defined
as correlation of azimuthal angle of each particle with respect to a common
symmetry plane Ψn. The vn and Ψn represent the magnitude and the phase
of a complex flow vector Vn, respectively. Azimuthal anisotropies are traditionally measured using 2- and/or multi-particle correlations over a large
range in pT and eta. However, hydrodynamic calculations show that the
event-by-event fluctuations in the initial conditions and the dynamics during
the system expansion lead to flow vector fluctuation in pT and/or η (also
called de-correlations of flow vector), including flow magnitude and flow angle fluctuations.
In this poster, we present the evidence of pT-dependent flow vector fluctuations in Pb–Pb collisions at √sNN = 5.02 TeV, using both vn{2}/vn[2]
and rn observables. In addition, newly proposed four-particle correlations
are used to study the contributions of flow magnitude and flow angle fluctuations separately. Considering that the size of flow vector fluctuations is
sensitive to both initial conditions and the properties of the created QGP,
these measurements will help us better constrain hydrodynamic models.

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Session Classification: Poster Session (I)

Track Classification: Heavy Ions