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Probe a small droplet of Quark-Gluon Plasma with flow-vector fluctuations at the LHC

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In the early universe, a special state of matter called quark-gluon plasma (QGP) existed. It consisted of the fundamental matter particles (quarks) and the force carriers of the strong interaction (gluons). By colliding heavy-ions at ultrarelativistic energies using the Large Hadron Collider (LHC) at CERN, we can recreate the early universe in a little "Little Bang" and study it under controlled conditions. A central method to study the QGP produced in accelerator collisions is the so-called anisotropic flow technique, that allows to study fundamental properties of the produced QGP droplets. It reveals that the QGP behaves like a near perfect fluid (close to the theoretical lower limit). The present paradigm has been established for collisions of heavy nuclei (Pb). However, recent measurements suggest that, contrary to expectations, flow phenomena have been seen in collisions between much smaller objects.
In this study, a new series of flow observables based on two-particle correlations will be measured using the LHC Run 2 data of small systems (p-Pb). Several analytic methods to measure the flow observables will be presented, each method uses a unique way to remove so-called non-flow (particles that were not created in the initial collision). This study is meant as an initial look at flow observables from small system collisions, which will lead to the systematic study of different small system collisions (p-p) with the necessary examination of the different analysis methods. Thus, giving a better understand if the flow observables in small systems are from the QGP or other mechanisms.

Field of study

Computational Physics

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Session Classification: Poster session: Enjoy the posters‼!