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Searches for the hydrodynamic fluid in small collision systems at the LHC

Friday, 11 September 2020 11:00 (30 minutes)

The primary goal of the ultra-relativistic heavy-ion collision program at the Large Hadron Collider (LHC) is to study the properties of the Quark-Gluon Plasma (QGP), a novel state of strongly interacting matter which exists in the early universe. Anisotropic flow, which quantifies the anisotropy of the momentum distribution of final state particles, is sensitive to the fluctuating initial conditions and the transport properties of the created QGP. The successful description of the measured anisotropic flow coefficients by hydrodynamic calculations suggests that the created medium behaves like a nearly perfect fluid. However, the observation of collective flow phenomena in high energy proton-lead and proton-proton collision triggers intense discussions. Whether the smallest droplet of QGP has been produced in these collisions or other physics mechanisms, including initial momentum anisotropy from Color Glass Condensate, will also be attributed to this phenomenon, is under debate.

In this talk, I will present the latest developments of flow studies in small collision systems at the LHC, including results from proton-lead at $\sqrt{s_{\rm NN}} = 5.02$ TeV and proton-proton collisions at $\sqrt{s} = 13$ TeV. I will focus on the current challenge of the hydrodynamic description on flow measurements with multi-particle cumulants. Furthermore, I will highlight the future opportunities for the coming LHC Run 3 program, which should eventually answer the fundamental questions if the hydrodynamic fluid has been produced in the small collision systems.

Is this abstract from experiment?

No

Internet talk

Maybe

Name of experiment and experimental site

N/A

Is the speaker for that presentation defined?

Yes

Details

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