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Event plane determination with the new ALICE FIT detector

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Event plane determination with the new ALICE FIT detector

The Fast Interaction Trigger (FIT) [1] is one of the new detectors being constructed for the upgrade of the ALICE experiment at CERN. FIT is a thoroughly modernized design, combining the functionality of four detectors used by ALICE during the LHC Run 2: the T0, V0, AD and FMD. During the upcoming LHC Run 3 and 4, in addition to the multiple triggering tasks, FIT will monitor luminosity, measure precisely the collision time, and determine centrality and event plane for heavy-ion collisions.

In non-central collisions, the geometry of the colliding nuclei can be described by the reaction plane that is determined by the beam axis and impact parameter. Since the impact parameter cannot be measured, one cannot determine the reaction plane precisely. An approximation for the reaction-plane angle Ψ_{RP} is the second-order event plane ψ_2, often called simply event plane ψ, that is given by the flow vector determined from the measured final hadrons. The difference between Ψ_{RP} and ψ is measured with event-plane resolution, that is evaluated using the sub-event method. [2]

In this presentation, I will summarise the FIT performance in Pb-Pb collisions during the Run 3 based on simulations using realistic detector- and beam pipe geometry. The focus will be on the influence of sub-event selection on event plane determination and resolution. These results will be compared to the performance of the ALICE setup during the LHC Run 2.

References

[1] W. H. Trzaska. New Fast Interaction Trigger for ALICE. Nucl. Instrum. Methods Phys. Res. A, 845:463–466, 2017. 10.1016/j.nima.2016.06.029.

[2] S. A. Voloshin, A. M. Poskanzer, and R. Snellings. Collective phenomena in non-central nuclear collisions. 2008. arXiv:0809.2949.

Secondary track (number)

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