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Type: Talk

Probing local parity violation in strong interaction via CMW measurement using the ALICE detector in Pb–Pb collisions

Monday 12 September 2022 16:00 (20 minutes)

In heavy-ion collisions, a strong magnetic field ($\sim 10^{15}$ T) is expected to be created, which together with the presence of a non-zero vector and axial currents gives rise to a collective excitation in the quark–gluon plasma (QGP) called the Chiral Magnetic Wave (CMW). The experimental signature of the CMW is charge-dependent elliptic flow, v_2 . In particular, the normalized difference of v_2 of positive and negative charges, $(\Delta v_{2\text{Norm}})$, may exhibit a positive slope as a function of the asymmetry (A_{ch}) in the number of positively and negatively charged particles in an event. However, non-CMW mechanisms such as Local Charge Conservation (LCC) intertwined with collective flow can also lead to a similar dependence of $v_{2\text{Norm}}$ on A_{ch} . A similar measurement with triangular flow v_3 can provide an estimate of the effect of LCC as we expect it not to be affected by the CMW.

In this talk, ALICE measurement of v_2 , $\Delta v_{2\text{Norm}}$, v_3 and $\Delta v_{3\text{Norm}}$ of inclusive and identified hadrons as a function of A_{ch} in Pb–Pb collisions will be presented. Finite slope parameters corresponding to $v_{2\text{Norm}}$ and $v_{3\text{Norm}}$ versus A_{ch} are measured as a function of collision centrality and compared with results from other experiments and models. In addition, the Event Shape Engineering technique is adopted for the first time to quantitatively distinguish the CMW signal and the LCC background.

Is this abstract from experiment?

Yes

Name of experiment and experimental site

ALICE

Is the speaker for that presentation defined?

Yes

Details

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Internet talk

Yes

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