Contribution ID: **309** Type: **Talk**

Search for local parity violation in strong interaction using the ALICE detector in Pb–Pb collisions

Thursday 15 December 2022 11:45 (15 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, ($\Delta v_{2_{\rm Norm}}$), may exhibit a positive slope as a function of the asymmetry ($A_{\rm ch}$) 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 $v_{2_{\rm Norm}}$ on $A_{\rm ch}$. A similar measurement with triangular flow v_3 can provide an estimate of the effect of LCC, as it is expected to be unaffected by the CMW.

We report the ALICE measurements on v_2, $\Delta v_{2_{\rm Norm}}$, v_3 and $\Delta v_{3_{\rm Norm}}$ of inclusive and identified hadrons as a function of $A_{\rm ch}$ in Pb–Pb collisions. Finite slope parameters corresponding to $v_{2_{\rm Norm}}$ and $v_{3_{\rm Norm}}$ versus $A_{\rm ch}$ 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.

Session

Heavy Ions and QCD

Author: DAS, Prottay (National Institute of Science Education and Research (NISER) (IN))

Presenter: DAS, Prottay (National Institute of Science Education and Research (NISER) (IN))

Session Classification: WG5-Heavy Ions and QCD