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Search for the chiral magnetic effect and the chiral magnetic wave with the ALICE experiment

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Theoretical considerations suggest the chiral magnetic effect (CME) and chiral magnetic wave (CMW) are reflected in a charge separation with respect to the event plane in heavy-ion collisions. Although considerable experimental efforts have been expended to investigate the existence of such phenomena, in recent years, evidence remains inconclusive because observables sensitive to these effects are challenged by the presence of strong background processes.

In this talk, we present results of searches for the CME/CMW with charge dependent two- and three-particle correlators based on unidentified and identified hadrons in Pb-Pb, p-Pb and Xe-Xe collisions at the TeV energy scale. A novel data-driven method was used to constrain the CME contribution to multi-particle correlators. This method relies on correlations of particles relative to higher harmonic symmetry planes to quantify the contribution of background effects to the CME sensitive observables. An updated upper bound from ALICE on the CME fractional contribution in Pb-Pb collisions is obtained. The results are compared with various theoretical calculations and results from other experiments.

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