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LPV and Chiral Magnetic Effect: status and open questions

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I provide an analysis of theoretical and phenomenological searches for local parity violation manifested through the Chiral Magnetic Effect. I discuss the relevant correlation functions used for the measurements, and argue that the present experimental evidence for the Chiral Magnetic Effect is rather ambiguous. I further discuss various background contributions due to conventional physics, which need to be understood quantitatively in order to draw a definitive conclusion about the existence of local parity violation in heavy ion collisions. Finally, I propose a simple observable which can distinguish between the Chiral Magnetic Effect and various elliptic-flow-induced effects.