

1 **Event-by-event correlations between $\Lambda/\bar{\Lambda}$ handedness and charge**
2 **separation w.r.t. event plane in Au+Au collisions at**

3 $\sqrt{s_{NN}} = 27$ **GeV from STAR**

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6 **Abstract**

7 Quantum chromodynamics (QCD) predicts topological charge fluctuations in vacuum, resulting
8 in chirality imbalance or parity violation in local domains. This would give rise to imbalanced
9 numbers of left- and right-handed (anti-)quarks, inherited by (anti-)lambda handedness $\Delta n =$
10 $\frac{N_L - N_R}{N_L + N_R} \neq 0$, as well as charge separation along strong magnetic field, the so-called chiral magnetic
11 effect (CME), characterized by the parity-odd azimuthal correlator with respect to the reaction
12 plane $\Delta a_1 = \langle \pm \sin(\phi_{\pm} - \Psi) \rangle$. While the Δa_1 variance measured via $\Delta \gamma = \langle \cos(\phi_1 + \phi_2 - 2\Psi) \rangle$
13 ~~has not led to affirmative conclusion on the~~ is designed to test the existence of CME, covariance
14 measurement between Δn and Δa_1 may reveal new insights on the phenomenon and on initial
15 imbalance of chirality created in the medium. [1]. We report exploratory measurements of event-
16 by-event correlations between Δn and Δa_1 by the STAR experiment in Au+Au collisions at 27
GeV.

¹⁷ [1] L. E. Finch and S. J. Murray, Phys. Rev. C **96**, 044911 (2017).