

1 **Event-by-event correlations between $\Lambda/\bar{\Lambda}$ handedness and charge**
2 **separation with respect to event plane in Au+Au collisions at**

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

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Abstract

6 Quantum chromodynamics (QCD) predicts topological charge fluctuations in vacuum, resulting
7 in chirality imbalance or parity violation in local domains. This would give rise to imbalanced
8 numbers of left- and right-handed (anti-)quarks, inherited by (anti-) Λ handedness $\Delta n = \frac{N_L - N_R}{N_L + N_R} \neq$
9 0, as well as charge separation along the direction of the initial strong magnetic field, the so-
10 called chiral magnetic effect (CME), characterized by the parity-odd azimuthal correlator with
11 respect to the reaction plane $\Delta a_1 = \langle \pm \sin(\phi_{\pm} - \Psi) \rangle$. While the Δa_1 variance measured via
12 $\Delta \gamma = \langle \cos(\phi_1 + \phi_2 - 2\Psi) \rangle$ is designed to test the existence of CME, covariance measurement between
13 Δn and Δa_1 may reveal new insights on the phenomenon and on initial imbalance of chirality
14 created in the medium. [1]. We report exploratory measurements of event-by-event correlations
15 between Δn and Δa_1 by the STAR experiment in Au+Au collisions at $\sqrt{s_{NN}} = 27$ GeV.

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