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Manifestations of local parity breaking in heavy ion collisions

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We investigate how local parity breaking due to fluctuations of the topological charge may affect hadron physics in heavy ion collisions. A distorted dispersion relation is derived for the lightest vector mesons ρ and ω and compared to the experimental results. The main characteristic of LPB is an invariant mass splitting that depends on the polarization. We present a detailed analysis of the invariant mass and angular distribution associated to the lepton pairs created from these mesons looking for possible LPB effects. Two angular variables are found to carry the main information related to the parity breaking effect. Possible signatures for experimental detection of LPB are discussed. We also discuss how LPB may affect other hadronic processes such as Dalitz decays.

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