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Structure and Signals for a Lifshitz Regime

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In the plane of temperature and chemical potential, QCD may exhibit a Critical End Point (CEP). If a region with spatially inhomogeneous condensates exists, there may also be a Lifshitz Regime, either instead of, or in addition to, a CEP. We study the Lifshitz Regime using both a large N expansion and using numerical simulations at small N . Experimentally, we contrast the fluctuations in net proton number when one injects momenta from a condensate at zero momentum, near a CEP, to that at non-zero momentum, in a Lifshitz Regime. This is done using a hydrodynamic code, including especially the effect of the rapid expansion of the local rest frame of the medium.

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