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Quark Number Fluctuations in a Chiral Model with a Magnetic Field LIDENS CHENG, VIVIAN INCERA, University of Texas at El Paso — An important consequence of quantum chromodynamics (QCD) is the existence of a phase transition between the hadronic and quark-gluon phases. The hadronic phase exhibits confinement and broken chiral symmetry. The quark-gluon phase exhibits deconfinement and chiral symmetry. The phase boundary can be seen in the temperature-quark chemical potential plane. For large chemical potential, there is a first order chiral transition. For small chemical potential and 2 massless quarks flavors, there is a second order chiral transition. Thus, a critical end point (CEP) is expected where the first order phase transitions end. In the chiral limit or for finite quark masses, the net quark number susceptibility diverges at the CEP. However, when clear from the CEP, it is finite. Hence, the net quark number susceptibility is non-monotonic along the phase boundary if there is a CEP. In this case, the Nambu–Jona-Lasinio model is composed at finite temperature and quark and isospin chemical potentials. The addition of a strong magnetic field in the model is significant because strong magnetic fields are produced in off-central heavy-ion collisions and are present at the core of neutron stars.

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