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Fluctuations near the liquid-gas and chiral phase transitions in hadronic matter

Wednesday, 6 September 2023 14:40 (20 minutes)

In this talk I discuss the fluctuations of the net-baryon number density in dense hadronic matter. Chiral dynamics is modeled via the parity doublet Lagrangian, and the mean-field approximation is employed to account for chiral criticality. I explain the qualitative properties and systematics of the second-order susceptibility of the net-baryon number density for individual positive- and negative-parity nucleons whose masses become degenerate at the chiral restoration. I argue that the second-order susceptibility of the positive-parity state can become negative when the chiral symmetry is restored, as a natural consequence of the unique relationship of the mass to the order parameter and are indicative of approaching the critical point on the chiral phase boundary. The results may have consequences for the interpretation of the experimental data on net-proton fluctuations in heavy-ion collisions.

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Category

Theory

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