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Modulated instabilities and the AdS2 point in dense holographic matter

Friday 6 September 2024 14:30 (20 minutes)

We investigate the effect that a Chern-Simons term has on the phase diagram of quark matter at finite density and temperature. We carried out the complete fluctuation analysis of the chirally symmetric black hole phase of the bottom-up holographic model V-QCD which models the deconfined phase of QCD. We classify all fluctuations and therefore all quasi-normal modes.

We also analyse the fluctuations at the AdS_2 IR point, which realizes the quantum critical line of the dual theory at zero temperature and finite density. We computed the dimensions of the fluctuations in the corresponding one-dimensional IR CFT, and showed how the (purely imaginary) QNMs of the black hole phase map to these AdS_2 modes as the temperature approaches zero.

As it turns out, the Chern-Simons term in V-QCD introduces a strong Ooguri-Park instability at finite temperature and chemical potential, but only at finite momentum. We finally investigate the region in which the instabilities appear in the phase diagram.

Link to publication (if applicable)

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