19th International Conference on QCD in Extreme Conditions (XQCD 2023)

Contribution ID: **3** Type: **Invited Talk**

Bose condensation in dense QCD

Thursday 27 July 2023 08:30 (45 minutes)

In this talk, I will discuss recent progress in our understanding of pion and kaon condensation in dense QCD. Using chiral perturbation theory at finite isospin and strangeness density, we map out the phase diagram. We also include electromagnetic interactions. The equation of state, speed of sound, chiral and pion condensates are calculated to next-to-leading order in the low-energy expansion. The results are compared to recent high-precision lattice simulations and the results are generally in very good agreement.
We discuss the effective field theory that describes the Goldstone bosons arising from the spontaneous breakdown of U(1)-symmetry.
In the nonrelativistic limit, we recover the classic results for the dilute Bose gas. These include leading corrections to the mean-field result for the energy density as well as the damping rate of phonons.

Authors: Dr ZHOU, Hua; Mr MOJAHED, Martin; Dr ADHIKARI, Prabal; Dr YU, Qing; Prof. ANDERSEN, Jens Oluf

Presenter: Prof. ANDERSEN, Jens Oluf

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