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# Speed of sound exceeding the conformal bound in dense 2-color QCD

We obtain the equation of state (EoS) for two-color QCD at low temperature and high density from the lattice Monte Carlo simulation. Two-color QCD is a good toy model of a real three-color QCD. The advantage to study this model is that the sign problem is absent even in a finite density regime because of the pseudo-reality of the quark field. We find that the speed of sound exceeds the conformal bound ($c_s^2/c^2 = 1/3$) after BEC-BCS crossover in the superfluid phase. Such an excess of the sound velocity is previously unknown from any lattice calculations for QCD-like theories. This finding might have a possible relevance to the EoS of neutron star matter revealed by recent measurements of neutron star masses and radii. This talk is based on PTEP 2022 (2022) 11, 111B01 (e-Print: 2207.01253).

## Topical area

QCD at Non-zero Density

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