

Pressure and speed of sound in two-flavor color-superconducting quark matter at next-to-leading order

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We investigate the thermodynamic properties of color-superconducting two-flavor quark matter at high densities and zero temperature at next-to-leading order (NLO) in the strong coupling and the gap. Assuming that the ground state of dense quark matter is a color superconductor, we calculate the pressure and the speed of sound for two massless quark flavors. Our results show that the NLO correction is comparable to the leading-order effects of the gap. In particular, we find that gap-induced corrections become increasingly relevant for both the pressure and the speed of sound. Finally, we provide a parameterization of the speed of sound and discuss generalizations of our results to three-flavor quark matter relevant to neutron stars.

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