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Bump of sound velocity in dense 2-color QCD

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We obtain the equation of state (p vs. e) and the sound velocity ($c_s^2/c^2 = \partial p/\partial e$) for two-color QCD at low temperature and high density and find that in the superfluid phase, c_s^2/c^2 becomes larger than $1/3$, which is the value at the relativistic limit. Several independent Monte Carlo studies on 2-color QCD have been conducted intensively in recent years, and have found clear evidence of phase transition between hadronic and superfluid phases.

Our result is consistent with several recent works based on effective models which have shown the peak of sound velocity.

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