

Trace anomaly as a measure of conformality at finite density

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We shed a light on the nature of matter at extremely high baryon density and contrast it to hot QCD matter by using the trace anomaly as a measure of conformality. We discuss an interpretation that a peak in the sound velocity in high-density matter, as suggested by the neutron-star observational data, signifies strongly-correlated conformal matter. The normalized trace anomaly is a dimensionless measure of conformality leading to the derivative and the non-derivative contributions to the sound velocity. We find that the peak in the sound velocity is attributed to the derivative contribution from the trace anomaly that steeply approaches the conformal limit. Smooth continuity to the behavior of high-density QCD implies that the matter part of the trace anomaly may be positive definite. We discuss a possible implication of the positivity condition of the trace anomaly on the observable quantities in the real world.

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Theory / experiment

Theory

Group or collaboration name

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