

Reaching percolation and conformal limits in neutron stars

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Generating an ensemble of equations of state that fulfill multimessenger constraints, we statistically determine the properties of dense matter found inside neutron stars (NSs). We calculate the speed of sound and trace anomaly and demonstrate that they are driven towards their conformal values at the center of maximally massive NSs. The local peak of the speed of sound is shown to be located at values of the energy and particle densities which are consistent with deconfinement and percolation conditions in QCD matter. We also analyze fluctuations of the net-baryon number density in the context of possible remnants of critical behavior. We find that the global maxima of the variance of these fluctuations emerge at densities beyond those found in the interiors of NSs.

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