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Search for conformal invariance in compressible two-dimensional turbulence

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We present a search for conformal invariance in vorticity isolines of two-dimensional compressible turbulence. The vorticity is measured by tracking the motion of particles that float at the surface of a turbulent tank of water. The three-dimensional turbulence in the tank has a Taylor microscale $Re_\lambda \simeq 160$. The conformal invariance theory being tested here is related to the behavior of equilibrium systems near a critical point. This theory is associated with the work of L\"owner, Schramm and others and is usually referred to as Schramm-L\"owner Evolution (SLE). The system was exposed to several tests of SLE. The results of these tests suggest that zero-vorticity isolines exhibit noticeable departures from this type of conformal invariance.

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