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**Three-dimensional (3D) shadowgraph technique visualizes thermal convection** JINZI HUANG, Courant Institute of Mathematical Sciences, JUN ZHANG, Courant Institute of Mathematical Sciences; NYU Department of Physics; NYU Shanghai, PHYSICS AND MATHS RESEARCH INSTITUTES, NYU SHANGHAI TEAM, APPLIED MATHS LAB, NYU TEAM — Shadowgraph technique has been widely used in thermal convection, and in other types of convection and advection processes in fluids. The technique reveals minute density differences in the fluid, which is otherwise transparent to the eyes and to light-sensitive devices. However, such technique normally integrates the fluid information along the depth of view and collapses the 3D density field onto a 2D plane. In this work, we introduce a stereoscopic shadowgraph technique that preserves the information of the fluid depth by using two cross-field shadowgraphs. The two shadowgraphs are coded with different and complementary colors, and each is seen by only one eye of the viewer. The two shadowgraphs can also be temporally modulated to achieve the same stereoscopic vision of the convective fluid. We further discuss ways to make use of this technique in order to extract useful information for research in fluids.

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