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Experimental Confirmation of a Causal, Covariant, Relativistic Theory of Dissipative Fluid Flow DILLON SCOFIELD, Dept. Physics, Oklahoma State University, PABLO HUQ, College of Earth, Ocean & Environment, University of Delaware — Using newtonian viscous dissipation stress in covariant, relativistic fluid flow theories leads to a violation of the second law of thermodynamics and to acausality of their predictions. E.g., the Landau & Lifshitz theory, a Lorentz covariant formulation, suffers from these defects. These problems effectively limit such theories to time-independent flow régimes. Thus, these theories are of little fundamental interest to astrophysical, geophysical, or thermonuclear flow modeling. We discuss experimental confirmation of the new geometrodynamical theory of fluids solving these problems (GTF, Fluid Dynamics, Research, 46, 055513,055514 (2014), Submitted 2015). This theory is derived from recent results of geometrodynamics showing current conservation implies gauge field creation; the vortex field lemma (Phys. Lett. A 374 3476–82 (2010)).

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