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Nonlinear Transverse Wave Excitations in Fluid Flows DILLON SCOFIELD, Dept. Physics, Oklahoma State Univ., PABLO HUQ, Univ. Delaware — The interplay of inertia and dissipation in flows with nonlinear transverse wave excitations is described by including a vortex field into the stress-energy balance equation. The theory uses an acoustic spacetime which allows limiting the speed of propagation of fluid transverse waves to a maximum speed. In the low speed limit, the theory reduces to the Navier-Stokes equations. By examining other limiting cases we show that the Navier-Stokes theory neglects terms involved with the transport of vorticity and the dissipation of energy due to the vortex field. Comparison of the theory to experiment, relative to the Navier-Stokes theory, shows that the presence of the vortex field accounts for the observed relative increase in energy- dissipation, extended lifetime of vortex structures, and excitation structure of the transverse wave field.

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