Abstract Submitted
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Quantum turbulence W.F. VINEN, University of Birmingham UK, GARY IHAS, University of Florida — Turbulence in a superfluid system, such as the low-temperature phases of the two isotopes of liquid helium, ^{4}He or ^{3}He, is strongly influenced by three quantum effects: the existence of two interpenetrating fluids, the normal and superfluid components, which can have separate velocity fields; the inviscid nature of the superfluid component; and quantum restrictions that exist on rotational motion in the superfluid component. These quantum restrictions mean that the only form of rotational motion in the superfluid component must be a quantized vortex filament. We discuss in general terms how these effects modify types of turbulence that can occur in classical fluids and how they can lead to new types of turbulence. We shall refer to the effect on Richardson cascades and Kolmogorov energy spectra, how energy is dissipated in a system without viscosity, and how forced relative motion of the two fluids can lead to a type of turbulence that is unknown in classical fluid dynamics.

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