Abstract Submitted
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Echoes and phase-unmixing in fully developed tokamak turbulence WILLIAM DORLAND, Univ of Maryland-College Park, ALEX SCHEKOCHIHIN, University of Oxford, NOAH MANDELL, Princeton University, DAVID HATCH, Institute for Fusion Studies, UT-Austin, ANJOR KANEKAR, Palantir, JAKE BRINGEWATT, University of Maryland-College Park, GREG HAMMETT, Princeton University — Echoes in quiescent plasma are well understood. Here, we describe the role of echoes (and more generally, "phase-unmixing") in fully developed turbulence. We demonstrate that echoes are ubiquitous, important, and easily understood and modeled. We demonstrate their role in preserving the observed density fluctuations in the solar wind – density fluctuations which would otherwise be Landau damped. We then explain their importance in tokamak turbulence and demonstrate how they can be modeled, particularly with highly efficient gyrofluid methods. The essential difference between what we present here and what we have published recently is our inclusion of finite Larmor radius physics. We extend our previous analysis and simulations of long wavelength fluctuations to treat fluctuations with wavelengths comparable to or much smaller than an ion gyroradius, as is typical in tokamak microturbulence.

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