Abstract Submitted
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Gyrokinetic Studies of Astrophysical Turbulence[1] GREGORY HOWES, UC Berkeley, STEVEN COWLEY, UCLA, WILLIAM DORLAND, U. Maryland, GREGORY HAMMETT, PPPL, ELIOT QUATAERT, UC Berkeley, ALEXANDER SCHEKOCHIHIN, Cambridge — Magnetized turbulence plays an important role in a wide variety of astrophysical plasmas, including accretion disks, the solar wind, and the interstellar and intracluster medium. Theories of magnetohydrodynamic (MHD) turbulence suggest that, at small scales, fluctuations become highly elongated along the direction of the magnetic field with frequencies small compared to the ion cyclotron frequency. In some astrophysical settings, the dissipation of this turbulence occurs under collisionless conditions, requiring the inclusion of the kinematic dynamics of the Landau resonance. Such turbulence is well described by a low-frequency expansion of kinetic theory called gyrokinetics. Here we describe efforts to study astrophysical turbulence using gyrokinetics, employing both analytical and numerical approaches, including a detailed understanding of the dissipation of the turbulence and consequent particle heating. Implications of this work for particle heating in radiatively inefficient accretion flows, heating and power spectra in the solar wind, and density fluctuations in the interstellar medium are discussed.

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