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Nature of Kinetic Scale Turbulence in the Earths Magnetosheath CHRISTOPHER CHEN, Queen Mary University of London, STANISLAV BOLDYREV, University of Wisconsin-Madison — We present measurements from the Magnetospheric Multi-Scale (MMS) mission, together with corresponding theoretical results, to investigate turbulence at kinetic scales in the Earths magnetosheath, the region downstream of the bow shock. In some respects, this turbulence is similar to that in the upstream solar wind, but one key difference is that whereas in the solar wind the ion and electron temperatures are typically comparable, $T_i \sim T_e$, in the magnetosheath, the ions are typically much hotter $T_i \gg T_e$ as a result of processing by the bow shock. Together with $\beta_i \sim 1$, this leads to a new type of turbulence close to electron scales. This turbulence is characterized by an increased magnetic compressibility, following a mode we term the inertial kinetic Alfvn wave, and a steeper spectrum of magnetic fluctuations, consistent with the scaling $k_\perp^{-11/3}$ that we obtain from a set of nonlinear equations. This new regime of plasma turbulence may also be relevant for other astrophysical environments with $T_i \gg T_e$, such as the solar corona, hot accretion flows, and regions downstream of collisionless shocks.

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