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Kinetic dissipation of high-frequency MHD turbulence[1] BENJAMIN CHANDRAN, University of New Hampshire — The dissipation of MHD turbulence at small scales by kinetic processes is critical for a number of problems in astrophysical plasmas, including the heating of the solar corona and the acceleration of particles in solar flares. The nature of such kinetic dissipation in turn depends critically on the frequencies of the turbulent fluctuations at the small-scale end of the inertial range. In linear theory, collisionless dissipation of waves with frequencies much less than the ion cyclotron frequency is unable to increase the perpendicular temperature of ions due to magnetic-moment conservation. On the other hand, waves at frequencies comparable to the ion cyclotron frequency dissipate via cyclotron damping and can cause perpendicular ion heating. A key problem for the kinetic dissipation of turbulence is thus to determine the fraction of turbulent power that reaches the cyclotron frequency. This problem is particularly important for the solar wind, where there is direct observational evidence that perpendicular ion heating occurs. This presentation will describe a weak turbulence theory for low-beta MHD plasmas that predicts the fraction of the turbulent power that is dissipated via the cyclotron resonance. The possible role of cyclotron damping of MHD turbulence in solar flares will also be briefly discussed.

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Benjamin Chandran
Space Science Center and Department of Physics,
University of New Hampshire

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