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Turbulence in the Solar Corona and Solar Wind and the "Parallel Energy Cascade"[1] BENJAMIN CHANDRAN, University of New Hampshire — Observations of perpendicular ion heating and energetic particle scattering suggest that a "parallel energy cascade" is operating in the solar corona and solar wind, whereby wave-wave nonlinearities generate a population of small-scale fluctuations that vary more rapidly along the background-magnetic-field direction than in the directions perpendicular to the background magnetic field. This suggestion from observations is seemingly at odds with theoretical studies of incompressible MHD turbulence, which find that wave-wave nonlinearities generate small-scale structures that vary most rapidly perpendicular to the (local) background magnetic field. However, because the corona and solar wind are compressible plasmas, the energy cascade in the corona and solar wind is significantly different than in the incompressible case. In this presentation, I will discuss new results on compressible MHD turbulence that describe how Alfven waves, fast magnetosonic waves, and slow magnetosonic waves interact with one another to generate a parallel energy cascade.

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