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Highlights from Gyrokinetic Simulations of Solar Wind Turbulence

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Gyrokinetic simulation codes, developed to a high level of sophistication in the fusion energy science program, are well suited for the study of turbulence in weakly collisional space and astrophysical plasmas, such as the solar wind. I will present a number of exciting recent results in the study of the dissipation range of solar wind turbulence using the Astrophysical Gyrokinetics code, AstroGK. Important results include: (1) a magnetic energy spectrum over the entire dissipation range (from ion to electron scales) the shows striking agreement with high resolution spacecraft observations, (2) evidence for an anisotropic distribution of energy in wavevector space in agreement with arguments for critically balanced kinetic Alfven wave turbulence, (3) an exponentially decaying form of the magnetic energy spectrum at the scale of the electron Larmor radius in agreement with recent observations, and (4) evidence that dissipation is dominated by collisionless wave-particle interactions rather than current sheets.