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Kinetic Simulations of Solar Wind Turbulence and Heating JASON TENBARGE, GREGORY HOWES, University of Iowa — New high sampling rate solar wind observations have been extended into the dissipation range of the solar wind turbulence spectrum, where nearly power-law energy spectra are observed. Recent theoretical studies have demonstrated that the dissipation range of the solar wind is well modeled by a cascade of kinetic Alfvén waves. As such, a fully nonlinear kinetic simulation code, AstroGK, is employed to model the turbulent cascade of energy in the solar wind and corona to accurately capture the dissipation range. Milestone simulations employing a realistic mass ratio and plasma $\beta = 0.01$, 0.1, 1, 10, and 100 spanning from MHD scales to the electron gyroradius are presented. The large dynamic range of the simulations and their kinetic nature capture both the splitting of the turbulent energy at the proton gyroradius scale into a kinetic Alfvén wave cascade and ion entropy cascade and the physical dissipation of the turbulence below the proton gyroradius, providing novel insight into the heating of solar wind and coronal ions due to kinetic processes in the dissipation regime.

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