Self-Similar Electron Distribution Functions in the Solar Wind KONSTANTINOS HORAITES, STANISLAV BOLDYREV, University of Wisconsin-Madison — Although the temperature and density of solar wind electron velocity distribution functions (eVDFs) vary significantly as a function of heliocentric distance, the shape of the distributions—characterized by a thermal core and suprathermal tails—varies only weakly. We suggest that this may be due to the peculiar conditions of the solar wind; specifically, the observed radial density and temperature profiles are such that the ratio between the mean free path λ and the characteristic distance $L_T = T/|dT/dr|$ over which the temperature varies is nearly constant. If λ/L_T (also known as the temperature Knudsen number) is exactly constant, then the collisional kinetic equation admits self-similar solutions. We discuss these solutions and their applicability to the solar wind near 1 AU.

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