

Solar wind thermodynamics in the era of NASA Parker Solar Probe

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The solar wind plasma distributions at 1 AU suggest the evolution by Coulomb collisions from nonthermal states to collisional equilibrium. Measurements at 0.3 AU are generally more nonthermal. This Coulomb coupling relationship can be used to probe the plasma distributions of the inner heliosphere and suggests that the coronal population will be highly nonthermal. Furthermore, measurements of plasma waves at 1 AU suggest nonlinear evolution from a population of intense Alfvén waves in the inner heliosphere. Taken together, these observations suggest that the coronal plasma environment is highly nonthermal and perhaps permeated by impulsive jets or waves. I will also describe the NASA Parker Solar Probe mission which will launch in summer 2018 and orbit the Sun with a final perihelion of 9.8 solar radii, well within the predicted Alfvén surface. Parker Solar Probe will make the first ever in situ measurements of plasma heating processes in the solar corona.