

Abstract Submitted
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The development and stability of non-thermal plasma in space

JUSTIN KASPER, Univ of Michigan - Ann Arbor — This talk will review our understanding of non-thermal ion and electron velocity distribution functions (VDFs) in space plasma, with a focus on pressure anisotropy and unequal temperatures in the solar wind and corona. Under typical solar wind plasma conditions, which are common for a range of astrophysical plasmas, relaxation processes such as Coulomb collisions are sufficiently slow compared to interactions between particles and electromagnetic fluctuations that ion and electron VDFs can depart significantly from the classical Maxwell-Boltzmann distribution and maintain these non-thermal features for times greater than the dynamical scales of the system. These non-thermal properties of the plasma are very important as they can significantly modify aspects of the plasma such as heat flux, susceptibility to kinetic instabilities, and interaction with waves and turbulence. Major open questions in the field will be reviewed, along with current and planned observational capabilities of instruments on spacecraft such as Wind and the upcoming Parker Solar Probe, with an eye to potential crossover with laboratory plasma experiments.

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