Non-Maxwellian distributions in the solar corona and flares: A new paradigm?

Dr. Jaroslav Dudík/NASA Postdoc

Abstract: Dynamic events in outer solar atmosphere can lead to departures of the distribution of particle energies from the equilibrium one. Though postulated almost 30 years ago, the observational evidence was largely lacking until a few years back. In this talk, the physical conditions for formation of the non-Maxwellian distributions will be reviewed, as well as the proposed diagnostic techniques and their application on the data. While the presence of strongly peaked distributions during impulsive phase of solar flares is now a well-established fact, the presence of kappa-distributions exhibiting high-energy tails in the solar corona still remains elusive largely due to the errors in spectroscopic data. In spite of this, kappa-distributions have been detected in a variety of astrophysical environments including the solar transition region. Implications for the coronal heating are discussed.