

# Suprathermal kappa populations: From observations to realistic interpretation

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Suprathermal populations enhance the high-energy tails of the velocity distributions of particles in space plasmas (i.e., solar wind, and planetary magnetospheres). Standard Maxwellian models cannot describe the observed distributions, which are instead well reproduced by the Kappa power-laws. However, the family of Kappa distribution functions do not offer a unique representation of the suprathermals. Here we contrast the alternative methods proposed in the last decades in the attempts to describe these populations and, implicitly, their effects in the solar wind. A realistic interpretation is conditioned by a rigorous modelling in accord with the observations, and in turn, the effects predicted for the same suprathermal populations must also be confirmed by the observations.

[1] Lazar et al. AA **582**, A124 (2015); AA **589**, A39 (2016), AA (2017) in press.

[2] Pierrard, et al. Solar Phys. **291**, 2165 (2016).

[3] Lazar, Phys. Plasmas **24**, 034501 (2017).