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Theoretical Aspects of Kappa Distributions

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Deadline for manuscript submissions:
closed (31 December 2019)

Message from the Guest Editor

Dear Colleagues,

Classical particle systems reside at thermal equilibrium with their velocity distribution function, stabilized into a Maxwell distribution. On the other hand, collisionless and correlated particle systems, e.g., space plasmas, are characterized by a non-Maxwellian behavior, typically described by the so-called kappa distributions. Empirical kappa distributions have become increasingly widespread across space and plasma physics. However, a breakthrough in the field came with the connection of kappa distributions with the solid background of non-extensive statistical mechanics. Understanding the statistical background and origin of kappa distributions was a cornerstone of further theoretical developments, e.g., among many others: the physical meaning of thermal parameters, e.g., temperature and kappa index; the N-particle description of kappa distributions; the generalization to phase-space kappa distribution of a Hamiltonian with non-zero potential; the entropy associated with kappa distributions. In this Special Issue, we welcome papers reporting on the progress of the theory of kappa distributions.

Dr. George Livadiotis

Guest Editor

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Editor-in-Chief

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Message from the Editor-in-Chief

The concept of entropy is traditionally a quantity in physics that has to do with temperature. However, it is now clear that entropy is deeply related to information theory and the process of inference. As such, entropic techniques have found broad application in the sciences.

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