

Tsallis statistics and related topics

Sumiyoshi Abe[1]

[1] Sch. Math., College of Sci. and Tech., Nihon Univ.

A certain class of physical statistical systems, to which standard Boltzmann-Gibbs (BG) theory cannot naively be applied, are considered. An attempt to generalize BG theory based on the principle of maximum entropy with Tsallis' nonextensive entropy is introduced. It is shown how this theory leads to a consistent thermodynamic framework. Applications to the problems of powders, nonneutral plasma and fully developed turbulence are explained. From the viewpoint of the intimate connection between Tsallis' entropy, (multi)fractals and q -deformation theory, a new perspective is given to log-periodic phenomena.