

The Tsallis Distribution in High Energy Physics

Tuesday, 2 December 2014 12:00 (45 minutes)

The use of Tsallis distributions in the analysis of High Energy Physics data has increased in recent years. These distributions are related on a Thermodynamics description of the hot hadronic-system produced at ultra-relativistic collisions, proposed by Hagedorn several years ago.

In this talk a brief review on the Thermodynamics description of HEP data and on the role that Tsallis distributions plays in the field will be presented. Some consequences of the application of these concepts in hadronic systems will be discussed. In particular, it will be shown that one can give a complete thermodynamics description of hot hadronic matter through the analysis of experimental data from HEP and/or from the analysis of the known hadron mass spectrum.

An extension of this Thermodynamics description for finite chemical potential was recently obtained, and will be discussed in this talk. Finally, some applications of the obtained Thermodynamics for studies of neutron stars and cosmology will be shown.

Summary

- 1) The Hagedorn's theory and Frautisch's description of hadrons.
- 2) Introduction of Tsallis theory in HEP.
- 3) The self-consistency principle in nonextensive statistics.
- 4) Hadron Thermodynamics and LQCD.
- 5) Hadron Thermodynamics for finite chemical potential.
- 6) Applications for neutrons stars and in Big-Bang nucleosynthesis.
- 7) Conclusions.

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