

Tsallis distribution as a Λ -deformation of the Maxwell-Jüttner distribution

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So far, no consensus really exists about a consistent thermodynamics within the special relativity framework. However, with the assumption that the inverse temperature 4-vector $\boldsymbol{\beta}$ is future-directed timelike, I show how the q -dependent Tsallis distribution might be viewed as a de-Sitterian deformation of the relativistic Maxwell-Jüttner distribution. The curvature of the de Sitter space-time is $\sqrt{\Lambda/3}$ where Λ is the cosmological constant as part of the Λ CDM standard model for Cosmology. Within a quantum statistical de Sitterian context we propose the following relation between the Tsallis parameter q and the cosmological constant:

$$q = 1 + \frac{c}{\sqrt{\Lambda}},$$