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Non-extensivity impacts on Hadronic Drag and Diffusion coefficients

In this work, we analyze the drag and diffusion coefficients of hadrons propagating in a thermal hadronic medium using the Fokker–Planck equation formulated within the Tsallis non-extensive statistical framework. The Tsallis non-extensive parameter q quantifies the deviation from equilibrium (q >1) and provides for a more realistic description of the medium, not perfectly thermalized. The hadronic bath, consisting of various mesonic and baryonic species, is controlled by different mass cutoffs which constitutes the spectral composition of the medium. Our analysis shows that both the drag coefficient F and the momentum diffusion coefficients Γ increases exponentially with temperature and a systematic increase with increasing q and mass cutoffs. The spatial diffusion coefficient D_x exhibits a decreasing trend with temperature T, non extensive parameter q and mass cutoffs which highlights the significant influence of non-equilibrium effects and hadronic composition of hadronic medium on the transport behaviour of propagating hadrons.

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