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Analytical solution of the nonlinear relativistic Boltzmann equation in the early universe and the thermalization of expanding systems

Tuesday, 29 September 2015 16:30 (2 hours)

In this talk we present a general method for computing exactly the nonlinear collision term of the relativistic Boltzmann equation for a homogeneous and isotropic system [1]. This is used to find the first full analytical solution of the nonlinear Boltzmann equation for an expanding system corresponding to the primordial matter in the early universe. This solution is used to investigate (in an analytical manner) how thermalization is reached in rapidly expanding kinetic systems. We also determine whether this expanding system displays a nontrivial scaling solution corresponding to a nonthermal fixed point.

Reference:

[1] D. Bazow, G. S. Denicol, U. Heinz, M. Martinez, and J. Noronha, "Analytical solution of the nonlinear relativistic Boltzmann equation in the early universe and the thermalization of expanding systems", to appear.

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