

Thermal regularization of t-channel singularities in cosmology

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A t-channel singularity appears when the mediator of a given t-channel process is kinematically allowed to be on its mass-shell. If, moreover, the mediator is massive and stable, the singularity cannot be regularized within the standard Breit-Wigner approach or using known methods of IR-divergences regularization. Although that issue may affect processes both beyond and within the Standard Model, it has been rarely considered in literature. In particular, for the cosmological case (i.e., for singular processes occurring in the early Universe, especially those involving hypothetical dark particles), no satisfactory solution has been proposed so far. In my talk I will formulate precise conditions for the t-channel singularity to appear in the cosmological context and provide SM and BSM examples of singular processes. Then, I will present a solution, based on interactions of the mediator with the surrounding gas of particles (described within so-called Keldysh-Schwinger formalism), that leads to finite results.

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