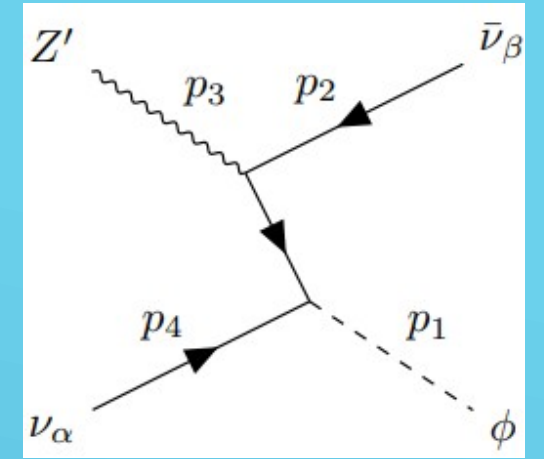




Particle Phenomenology

« An Analytic Prescription for t-channel Singularities »

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The t-channel singularity is a divergence in the scattering amplitude which occurs when a stable particle propagating in t-channel scattering process becomes an on-shell state. It is in a sharp contrast with s-channel type singularity which is always regulated by a decay width in s-channel particle. Such situations appear either in the system of collider experiments or in the context of the cosmological particle production. No scheme which is generally applicable is known. In this talk, I introduce a new formulation to identify and remove the source of the divergence. The scheme is fully analytical and various applications can be expected. Using concrete examples, I explain what are these singularities and I will present our method for t-channel singularity.

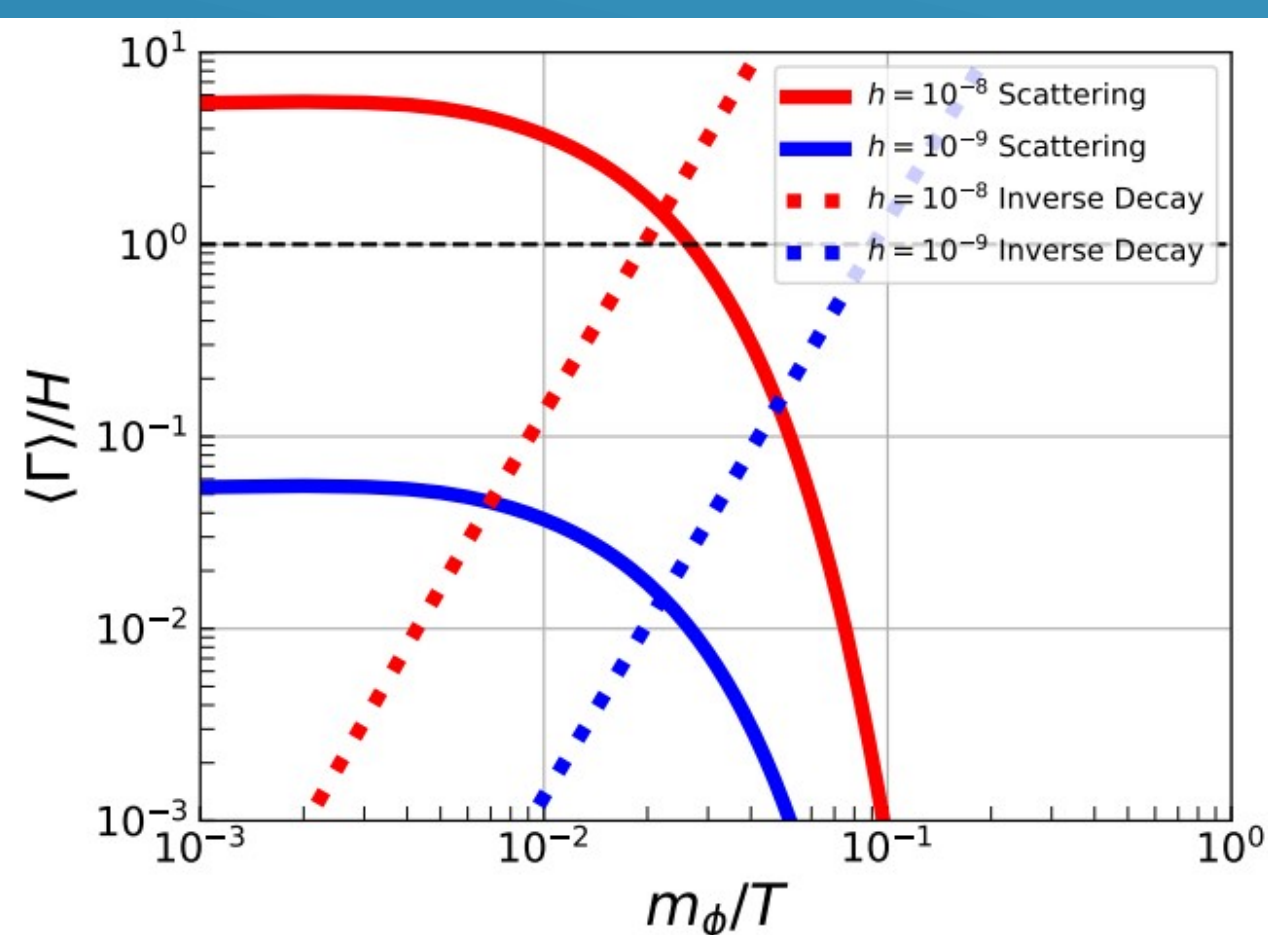


Figure 3: Comparison between the production efficiencies of the inverse decay and the scattering. Horizontal axis is the temperature of the Universe normalized by the Majoron mass, and the vertical axis shows the interaction rate. The scattering rate can dominate over the inverse decay rate at high temperatures. We fix the Majoron mass $m_\phi = 0.1$ MeV. We limit our discussion to the regime after the QCD phase transition.