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Stopping the dynamical relaxation by a particle production

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Content :

Dynamic relaxation provides an interesting framework which intends to solve the hierarchy problem by postulating, that the observed value of the electroweak scale was determined dynamically in the early Universe. Values of the electroweak scale were scanned during an evolution of axion-like field (a relaxion), with a stopping mechanism responsible for fixing the scale at a small value.

The original relaxation proposal depended on an ongoing inflation, putting significant constraints on the inflationary sector. Since then alternative variants of relaxation were proposed, which allow to decouple it from inflation completely. In these scenarios relaxation is stopped though a burst of particle production which happens when the relaxion enters a non-adiabatic region.

Qualitative and analytical approach can tell us a lot about the viability of such relaxation models. It is however still interesting to track the relaxation process in detail, which can only be done numerically. In this talk we will present our work towards such analysis done with a goal of investigating a subtle interplay between the relaxion, the electroweak scale, and the produced particles.

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