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Matter Genesis in the Coupled-Higgs-Tachyon Bounce Universe

In this talk we will present a mechanism for matter generation in a string-inspired bounce universe. Utilizing the coupling between a higgs-like scalar field and the tachyon emerged from the D-brane and anti-D-brane co-annihilation, we study the conversion between tachyon and standard model fields. During the matter-dominated contraction phase the SM particles that are produced by tachyon can be effectively converted back to tachyons. However during the expansion phase the SM fields lose energy and thus remain in the spectrum. We show that for a generic set of parameter values all tachyon quanta are successfully converted into SM particles, as represented by the Higgs-like scalar. This process is greatly aided by the phase space enhancement effects, called parametric resonance, due to the Bose condensation of the Higgs produced. We close with a few open questions and future directions of exploration.

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