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Cosmological history of the HEFT

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The Standard Model Effective Field Theory (SMEFT), where the Higgs doublet transforms linearly under electroweak symmetry, has gained popularity in the last decade for classifying the low-energy effects of heavy, new physics on experimental results. However, the SMEFT is not as general an Effective Field Theory as the Higgs EFT (HEFT), where the Higgs doublet transforms non-linearly. The universe, as always, is reluctant to reveal it's secrets: is it SMEFT or HEFT/SMEFT? Particle colliders will certainly shed some light on this dichotomy, yet they can only probe near the vacuum. We turn instead to cosmology, specifically the gravitational waves that may have been produced in an early universe phase transition, and could provide us with a new lens with which to resolve the SMEFT or HEFT/SMEFT dichotomy, and the nature of electroweak symmetry breaking.

PhD Student

yes

Author: WEST, MIA,ROBIN,BYRON

Co-authors: CRIADO ÁLAMO, Juan Carlos (University of Granada); HOUTZ, RACHEL (IPPP Durham); ALONSO DE PABLO, Rodrigo (University of Durham (GB))

Presenter: WEST, MIA,ROBIN,BYRON

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