

# JOINT TUFTS/MIT COSMOLOGY SEMINAR

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## *Higgs Inflation and the Electroweak Sector*

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Brown

Abstract: The study of both particle physics and cosmology is characterized by the presence of large scale hierarchies, that remain open theoretical puzzles. These must be resolved by hand, a process known as fine-tuning. In particle physics, one such manifestation is that of the stabilization of the Higgs potential, also known as 'the' hierarchy problem. Cosmology also involves a problem of large scales, namely that the potential of inflation must be flat enough, and remain so, in order for sufficient inflation to take place. We present a concrete implementation of the Cosmological Electroweak Symmetry Breaking, an idea originally laid out as a toy model in 2210.10735. In this construction, the Higgs, is a pseudo-Nambu-Goldstone-Boson, which can be accommodated by a coset model, has its hierarchy stabilized by a periodic potential; simultaneously, the Higgs through its interactions with weak gauge boson fields and gravity realizes an epoch of cosmic inflation on that same potential. The slow-roll condition is implemented through an additional coupling to the weak gauge field Chern-Simons term. The results and constraints of this construction are presented, as well as new directions to be pursued.

Tuesday, November 14, 2023, 2:30 pm

574 Boston Ave, Room 402

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Refreshments at 2:00 outside room 304