

# JOINT TUFTS/MIT COSMOLOGY SEMINAR

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## *Bubbles of Nothing: The Tunneling Potential Approach*

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Bubbles of nothing (BoNs) describe the decay of spacetimes with compact dimensions and are thus of fundamental importance for many higher dimensional theories proposed beyond the Standard Model. BoNs admit a 4-dimensional description in terms of a singular Coleman-de Luccia (CdL) instanton involving the size modulus field, stabilized by some potential  $V(\phi)$ . Using the so-called tunneling potential ( $V_t$ ) approach, we study which types of BoNs are possible and for which potentials  $V(\phi)$  can they be present. We identify four different types of BoN, characterized by different asymptotic behaviours at the BoN core. We study the interplay of BoN decays with other standard decay channels, identify the possible types of quenching of BoN decays and show how BoNs for flux compactifications can also be described in 4 dimensions by a multifield  $V_t$ . The use of the  $V_t$  approach greatly aids our analyses and offers a very simple picture of BoNs which are treated in the same language as any other standard vacuum decay.

Tuesday, April 16, 2024, 2:30 pm

574 Boston Ave, Room 402

Tufts University

Refreshments at 2:00 outside the building, at the corner of  
Harvard St. and Boston Ave.