

# JOINT TUFTS/MIT COSMOLOGY SEMINAR

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## *Scalar fields around black hole binaries in LIGO-Virgo-KAGRA*

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Light scalar particles arise naturally in many extensions of the Standard Model and are compelling dark matter candidates. Gravitational interactions near black holes can trigger the growth of dense scalar configurations that, if sustained during inspiral, alter binary dynamics and imprint signatures on gravitational-wave signals. In this talk I will describe the use of numerical relativity simulations to develop a waveform model for black hole binaries in scalar-field environments, which we apply it in a Bayesian analysis of the LIGO–Virgo–KAGRA catalog.

Tuesday, February 3, 2026, 2:30 pm  
Cosman Seminar Room  
Center for Theoretical Physics  
Building 6C, Room 6C-442  
Massachusetts Institute of Technology