

# JOINT TUFTS/MIT COSMOLOGY SEMINAR

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## *Probing exotic energy injection with the CMB and early star formation*

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Dark matter interactions with Standard Model particles can inject energy at early times, altering the standard evolution of the early universe. In particular, this energy injection can perturb the spectrum of the cosmic microwave background (CMB) away from that of a perfect blackbody, alter the CMB anisotropy spectrum, and affect processes by which the first stars form. For this study, I will discuss recent work to upgrade the DarkHistory code package to more carefully track interactions among low energy electrons, hydrogen atoms, and radiation, in order to accurately compute the evolution of the CMB spectral distortion in the presence of Dark Matter energy injection. I will show results for the contribution to the spectral distortions from redshifts  $z < 3000$  for arbitrary energy injection scenarios, new CMB anisotropy constraints on light dark matter, as well as the effect of exotic energy injection on early star formation.

Tuesday, March 5, 2024, 2:30 pm

574 Boston Ave, Room 402

Tufts University

Refreshments at 2:00 outside room 304