

JOINT TUFTS/MIT COSMOLOGY SEMINAR

Effective Field Theory Surprises for Black Holes

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In this talk, I will demonstrate a surprising way in which near-extremal black holes are sensitive probes of new physics. For extremal Kerr black holes, higher-derivative corrections cubic and quartic in the Riemann tensor induce tidal force singularities on the horizon, leading to a breakdown of the gravitational effective field theory close to the horizon. Adding a small charge dramatically strengthens this effect, with four-derivative terms in the Einstein-Maxwell effective action producing tidal forces that scale inversely with the black hole temperature. I will demonstrate this effect analytically in the extremal limit and numerically for finite-temperature black holes, and will estimate its size for realistic astrophysical scenarios.

Tuesday, March 31, 2026, 2:30 pm

574 Boston Ave, Room 310

Tufts University

Refreshments at 2:00 outside room 304