

The Entropy of Dynamical Black Holes and Apparent Horizons

Saturday 1 November 2025 09:00 (15 minutes)

We previously proposed a new formula for the entropy of a dynamical black hole (valid to leading order for perturbations off of a stationary black hole background) in an arbitrary classical diffeomorphism covariant Lagrangian theory of gravity in $\mathbb{R}$ dimensions. Our formula in general relativity gives the entropy of a dynamical black hole as its area minus an integral involving the expansion of the null generators of the horizon. In stationary eras, this formula agrees with the usual area formula, but in nonstationary eras, we obtain a nontrivial correction term. We previously showed that this new formula in general relativity agrees with the apparent horizon area to leading order. In this talk, I will discuss the generalization of this result to more general theories of gravity, with the goal of finding an analog of the apparent horizon in more general theories.

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