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Holographic duals to black hole evaporation

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We describe the dynamical evaporation of a black hole through quantum Hawking emission in holographic form, namely, as the classical gravitational evolution of a black hole in an Anti-de Sitter braneworld. A bulk black hole whose horizon intersects the brane yields the classical bulk dual of a black hole coupled to quantum conformal fields. The evaporation of this black hole happens when the bulk horizon slides off the brane, making the horizon on the brane shrink. We use a large-D effective theory to solve the time evolution of the bulk Einstein equations. With this method, we study the dual dynamical evaporation of a variety of black holes interacting with radiation baths. We also obtain the dual of the collapse of holographic radiation to form a black hole on the brane. Finally, we discuss the evolution of the Page curve of the radiation in our evaporation setups, with entanglement islands appearing and then shrinking during the decreasing part of the curve.

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