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Islands with Gravitating Baths in Double Holography

We study black hole information and entanglement islands in higher dimensions (d > 2) using the bottom-up Karch-Randall-Sundrum braneworld construction. Earlier work in the double-holography literature embeds a single Randall-Sundrum brane in (d+1)-dimensional AdS gravity and uses the Karch-Randall mechanism to realize a theory of a gravitating braneworld coupled at infinity to a nongravitating conformal bath. We make the bath gravitating by introducing a *second* brane and having it act as the bath. Unlike in previous studies of black holes in doubly holographic brane/bath systems, we find no dynamics in the entanglement entropy of Hawking radiation, although we do get islands. This is evidence that the information paradox may be resolved at the semiclassical level by a constant entropy curve, in agreement with the principle of holography of information.

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