(G*) Probing Hidden Topology with Quantum Detectors

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We consider the transition rate of a static Unruh-DeWitt particle detector in a variety of spacetimes built out of quotients of AdS$_3$ spacetime. In particular, we contrast the behavior of a Unruh-DeWitt detector interacting with a quantum scalar field in the $\mathbb{R}P^2$ geon spacetime and a spacetime constructed by Aminneborg et al. The Wightman functions of these spacetimes are obtained using the method of images. We find a number of features that distinguish the two spacetimes, which are identical outside of the black hole's event horizon, most notably, in the response functions of gapless detectors in the sharp-switching limit. This points to a way in which the interior topology of a black hole may be discerned by an external observer.

Keyword-1

Quantum Fields

Keyword-2

Black Hole

Keyword-3

Particle Detector

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