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# Particle Detectors as Topological Probes

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The apparent triviality of the topology of our universe stands in stark contrast to the properties of general relativity, which admits all possible topologies. The topological censorship theorem resolves this conundrum insofar as it relegates all isolated topological structures (such as wormholes) inaccessible to observers by any classical experimental means.

I will show here that an Unruh-DeWitt detector can indeed probe the global topology of a spacetime by making local measurements of a quantum field. Specifically, I will consider a massless scalar field on the BTZ spacetime —the 2+1 dimensional analog of a Schwarzschild spacetime —coupled in the canonical way to a particle detector. I will examine several trajectories of the detector, illustrating how the detector is sensitive to the topology that is partially hidden behind horizons. Implications for the topological censorship theorem will be discussed.

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