

Smoking Gun Signatures of Microscopic Black Holes at Neutrino Telescopes

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Large Extra Dimensions have been proposed as a compelling solution to the hierarchy problem, with a ‘true’ Planck scale that can be as low as a few TeV. In such scenarios, high-energy collisions can lead to the creation of microscopic black holes, which have been sought in cosmic ray interactions and at colliders. Future neutrino telescopes such as IceCube Gen2, km³Net, RNO and GVD have the potential to probe energies beyond the reach the next generation of colliders. I will describe the conditions to create and observe microscopic black holes at such telescopes, effects they may have on apparent unitarity violations in the flavor mixing matrix, as well as new, unique signatures in event topology and Cherenkov light timing. Taken together, these provide a clear prescription for identifying black holes on an event-by-event basis and a unique opportunity to discover physics beyond the Standard Model.

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