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Department of
Theoretical Physics

THE QUANTUM SPACETIME SEMINAR SERIES

Second law of black-hole thermodynamics in higher derivative theories of gravity

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In this talk we will discuss the construction of an entropy function for dynamical black holes in a specific higher derivative theory of gravity, namely Lovelock theories. As is known, in classical general relativity described by Einstein-Hilbert gravity, black holes behave as thermodynamic objects. The first law of black hole mechanics extends to higher derivative theories via the Noether charge construction of Wald. In order to extend the second law (which in Einstein-Hilbert theory owes to Hawking's area theorem) to higher derivative theories one needs a notion of entropy for dynamical black holes beyond the Noether charge construction. We will discuss one such possible extension for the Lovelock theories of gravity, treating the higher derivative terms as perturbations to Einstein's gravity.

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