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Black hole thermodynamics and boundary terms

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I discuss sensitivity of black hole thermodynamics to certain boundary terms in the action. While boundary terms cannot affect the classical gravitational dynamics, they apparently influence both the black hole entropy and temperature. Remarkably, this behaviour is confirmed by two standard approaches to black hole thermodynamics; the covariant phase space (Iyer-Wald) and the Euclidean grandcanonical ensemble (Brown-York). In my talk, I introduce our findings on the example of 4D scalar-tensor Einstein-Gauss-Bonnet gravity. I also comment on other cases that may display similar behaviour, in particular on thermodynamics of regular black hole solutions.

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