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Logarithmic Corrections in AdS/CFT

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It is well known that in the semi-classical limit, the entropy of black holes is universally given by the Bekenstein-Hawking formula. There are in fact corrections to this formula arising from higher derivative terms in the gravitational path integral or quantum effects to due matter fields propagating on a fixed gravitational background. Evaluating such corrections is a challenging endeavor, but there is one term, of logarithmic form, that is more accessible. In this talk, I will discuss how logarithmic corrections in four-dimensional AdS gravity theories can be extracted via the heat kernel and the differences between the logarithmic term in asymptotically flat and AdS spacetimes. I will show that our results match the one-loop computations from holographic field theories when it is known, and explain how the logarithmic correction produces constraints on effective field theories coupled to gravity.

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