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## Black hole thermodynamics in higher derivative theories of gravity

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Einstein's equations are a set of classical differential equations for gravity with maximum two space-time derivatives. Black holes are some singular solutions to Einstein's equations. They behave like large thermodynamic objects, indicating that they are actually an ensemble of the quantum states of gravity. Now any consistent quantum completion of Einstein's theory typically generates several higher derivative corrections. Therefore we expect that black holes will continue to satisfy the laws of thermodynamics even after adding the quantum gravity induced corrections to Einstein's equation. In this talk, we would like to see to what extent we could prove this expectation.

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