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Black Holes in Higher Derivative Gravity

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Including quadratic curvature terms in the gravitational action yields a renormalizable theory at the apparent cost of instability in the radiation field. One also
needs to consider the effects upon classical solutions such as black holes. All vacuum solutions to Einstein's theory remain good solutions to the higher derivative theory, so the Schwarzschild family carries over to the generalized theory. There are in addition non-Schwarzschild solutions, however, crossing the Schwarzschild family at a point governed by the Gross-Perry-Yaffe Lichnerowicz eigenvalue. This crossing point also appears to be a changeover point
for classical stability between the Schwarzschild and non-Schwarzschild black hole families.

Presenter: STELLE, Kellog