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Regular black holes from pure gravity

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I will show via an explicit construction how an infinite tower of higher-curvature corrections generically leads to the resolution of the Schwarzschild singularity in any spacetime dimension D≥5. The theories we consider have two key properties that ensure the results are general and robust: (1) they provide a basis for (vacuum) gravitational effective field theory in five and higher-dimensions, (2) for each value of the mass, they have a unique static spherically symmetric solution. I will present several exact solutions of the theories that include the Hayward black hole and others similar to the Bardeen and Dymnikova ones. Unlike previous constructions, these regular black holes arise as vacuum solutions, as we include no matter fields whatsoever in our analysis. Additionally, their thermodynamics properties can be studied in a completely universal and unambiguous way.

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