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Effective Quantum Spacetimes From Functionl Renormalization Group

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We construct effective spacetime geometries by self consistently deforming the classical Schwarzschild-de Sitter solution. This has been done in the context of the Functional Renormalization Group Asymptotic Safe program by exploring how quantum modifications induced by the running of the Newton and Cosmological constants impact the infrared and ultraviolet regimes of the modified solution.

The quantum corrections, stemming from the flow of the coupling constants, give rise to two new regimes. Firstly, a phase transition AdS/dS occurs in the UV regime, when the mass of the object exceeds a critical threshold. Secondly, we predict the formation of horizons whenever the mass of the object is of the order of the Planck mass.

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