Towards testing quantum gravity using cosmological observations

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I give a historically motivated overview of modern cosmology, focusing on recent developments and major problems, including current research themes. In particular, I discuss the challenge of using future cosmological data in order to devise practical tests of fundamental quantum theories of gravity and matter, which could address epistemic problems such as delineating the cosmological swampland and the wider question of effective falsifiability of such theories in the Popperian sense. The lectures assume some familiarity with modern concepts and ideas in classical and quantum gravity, differential and algebraic geometry and in the geometric theory of dynamical systems.

A very partial list of references

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9. D. J. Saunders, *The Geometry of Jet Bundles*, Cambridge U.P., 1989.

10. A. Katok, B. Hasselblatt, *Introduction to the modern theory of dynamical systems*, Cambridge U.P., 1995.

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Note. Some introductory references to cosmology can be found at:

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