

# Observations in Quantum Cosmology

*Thursday, 24 October 2024 10:45 (45 minutes)*

Quantum cosmology is the application of quantum theory to the universe as a whole. It is based on a theory of quantum gravity. Such a theory is not yet available in final form, but there are promising approaches. Based on one such approach, quantum geometrodynamics, which arises from the application of established quantization rules to Einstein's theory of general relativity, I discuss observational predictions in quantum cosmology.

These predictions are mainly concerned with the spectrum of the Cosmic Microwave Background (CMB) radiation. I shall argue that already the presently observed power spectrum of density fluctuations can be interpreted as a quantum gravity effect. Corrections to the measured power spectrum are proportional to the inverse Planck mass squared and are thus very small. They can be calculated precisely from quantum geometrodynamics, but are too small to be observed by existing satellite missions. I discuss prospects for the future.

My talk is partly based on: L. Chataignier, C. Kiefer, P. Moniz, *Classical and Quantum Gravity* 40 (2023) 223001 [arXiv:2306.14948]

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