CIDMA CENTRO DE I&D EM MATEMÁTICA E APLICAÇÕES
CENTER FOR R&D IN MATHEMATICS AND APPLICATIONS

universidade de aveiro

Gravitational Geometry and Dynamics Group Seminar

Tue., Jul. 11th, 2024, at 11h00.

Room: 11.2.21 and **Zoom ID:** 989 6252 0928
(*Password: contact graposo@ua.pt*)

The trans-Planckian problem in loop quantum cosmology

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One of the criticisms of the inflationary paradigm is that scales that are observable today were trans-Planckian at the onset of inflation. This questions the validity of standard results regarding the primordial power spectrum. Standard cosmology also ignores pre-inflationary dynamics, since it loses predictability close to the initial singularity.

Loop Quantum Cosmology (LQC) is an approach to the quantisation of cosmological models. It provides effective pre-inflationary dynamics where the big-bang singularity is resolved in terms of a quantum bounce that connects a contracting epoch of the Universe with an expanding one. In this talk, we investigate the trans-Planckian problem in two models of LQC.

We find that one of the models avoids the issue altogether by generating less e-folds of inflation, such that the observable modes never become trans-Planckian. On the other hand, the other model suffers from this problem, as observable modes become trans-Planckian during a time when they lose adiabaticity, making their primordial power spectrum susceptible to changes due to trans-Planckian physics.

More about Gr@v at: *gravitation.web.ua.pt*

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