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Rotating cosmologies: classical and quantum

I will talk about Bianchi cosmologies coupled to a matter source that has the field theoretical description of a solid. Models of solid inflation are known for not being very efficient in diluting away anisotropy. While confirming this fact, our study finds another potential feature of solid inflation, namely a "rotation"of the principal axes of the expansion. Such a rotation is not just a gauge artifact as in the case of Bianchi models alone or coupled to homogeneous scalar fields. Due to the anisotropic stress generated by the solid, rotation becomes a real dynamical quantity. The quantum counterpart of this model can be used as a framework to tackle certain puzzles of quantum cosmology, namely how to characterize the spacetime symmetries of a quantum state at the level of the wavefunction of the universe. Our approach reveals the ambiguities in operating a minisuperspace-like truncations of degrees of freedom, and how it could fail to be consistent at the quantum level.

The talk would be based on the recently submitted paper: arXiv:2204.04110

Primary author: ZEGHARI, Kenza (Aix-Marseille University)

Presenter: ZEGHARI, Kenza (Aix-Marseille University)

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