

Seminarium Zakładu Fizyki Teoretycznej

Departament Badań Podstawowych

Narodowego Centrum Badań Jądrowych

Dec 1, 2021 (Wednesday), h. 11:15

The seminar is held online:

https://www.gotomeet.me/NCBJmeetings/bp2_seminar

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(NCBJ)

"Homogeneous-isotropic sector of loop quantum gravity: new approach"

ABSTRACT: In loop quantum gravity substantial work has been done to construct a theory of quantum gravity in mathematically rigorous way. Promising candidates have been proposed and deriving physical predictions seems to be of only technical nature. In this talk I will focus on the homogeneous-isotropic sector of the theory, which is relevant to cosmology. It has been studied first by performing symmetry reduction classically and quantizing the resulting theory. This procedure leads to a theory called loop quantum cosmology, which predicts that big-bang singularity is replaced by big-bounce due to quantum gravity effects. In this talk I will propose a new approach, where the symmetry reduction is performed at the quantum level. I will start with brief introduction to some of the basic concepts in loop quantum gravity, focusing on the Hilbert space of states and the model of quantum gravity coupled to massless scalar field. Afterwards I will present the results of my paper [Class.Quant.Grav. 37 (2020) 185004] about a new approach to the symmetry reduction in loop quantum gravity.

Best regards,

T. Altinoluk, M. Kowal, P. Małkiewicz, E. Sessolo, P. Zin