

Seminarium Zakładu Fizyki Teoretycznej

Departament Badań Podstawowych
Narodowego Centrum Badań Jądrowych

December 11, 2024 (Wednesday), h. 11:15

The seminar will be held in room 207 @Pasteura 7

Jerzy Kowalski-Glikman

(NCBJ and University of Wrocław)

On Quantum and Gravity

ABSTRACT: The talk will be divided into three parts. In the first part, I will argue that the consistent quantization of Newtonian interactions necessitates the existence of a massless mediating particle, the graviton. This implies that a quantum theory of gravity could take the form of a Quantum Field Theory (QFT) of spin-2 particles interacting with lower-spin matter, such as that of the Standard Model or beyond. Within the framework of Effective Quantum Field Theory, such a QFT for gravitons must be supplemented by an (as yet unknown) ultraviolet (UV) completion to address challenges like non-renormalizability.

However, this effective field theory cannot serve as a complete description of quantum gravity, as it overlooks the essential ultraviolet/infrared (UV/IR) mixing. In the second part of the talk, I will explore why this mixing is crucial for resolving the cosmological constant problem.

Finally, in the third part, I will provide a brief overview of a novel approach to quantum gravity based on the so-called corner proposal, which is the focus of my current research.

Best regards,

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