

Seminarium Studium Doktoranckiego NCBJ

Poniedziałek, 18 grudnia, godzina 9:00

Sala 22 w NCBJ, Hoża 69

Speaker: Albin Nilsson

Title: The Standard Model Extension, Gravitational tests and Cosmology

Abstract: Combining the standard model and general relativity into quantum gravity is a task which has occupied physicists for over 50 years. These two theories are expected to merge at the Planck scale ($E_p \approx 10^{19}$ GeV).

However, experiments at this energy are beyond the reach of humanity at present. As such, we need a way to study the Planck scale effects that trickle down to accessible energies, thereby learning about the true dynamics of quantum gravity. This can be done using effective field theory, and since many theories of quantum gravity predict Lorentz and/or CPT violation, searching for signals of this is a good place to start. The Standard Model Extension (SME) is an effective field theory containing the standard model of particle physics, general relativity, as well as all possible operators which break Lorentz symmetry. Since CPT violation implies Lorentz violation, the SME also includes operators which both break and preserve CPT symmetry. In this talk, I will describe the structure of the SME, focusing on the gravitational sector. I will review some of the gravitational tests performed and discuss how we can study the SME in a cosmological setting