

Seminarium Studium Doktoranckiego NCBJ

Thursday, 10 June, 9:00

<https://www.gotomeet.me/NCBJmeetings/phd-seminar>

Speaker:

Szymon Nakoneczny (Studium Doktoranckie NCBJ)

Title:

Large Scale Structure and Cosmic Microwave Background in study of the Universe

Abstract:

Astrophysicists are now facing some of the biggest mysteries in science. Dark Matter (DM), which interacts only gravitationally and makes up to about 27% of the Universe, and Dark Energy (DE), which accelerates expansion of the Universe and makes up to about 68% of it, both fit to the theoretical model, but we do not understand their nature. On the other hand, we measure different values of cosmic parameters from different probes, which creates cosmic tension not explainable by any known theory. In my talk, I will describe how observations of the Large Scale Structure (LSS) and Cosmic Microwave Background (CMB) are used to shed light on these unknown problems. I will explain the concept of the epoch of recombination, in which the CMB originates, and give an introduction to the theory of the gravitational collapse which led to the development of the LSS. Then, I will give an introduction to Integrated Sachs-Wolfe (ISW) effect which changes energy of CMB photons as they travel through the decisively expanding Universe. In terms of data, I will focus on one of the largest radio surveys to date, the International Low-Frequency Array (LOFAR), which operates in many countries across Europe, including Poland. Finally, I will show my initial results on cosmic inference using LOFAR and CMB data.