Contribution ID: **6** Type: **not specified**

The ZA Expansion Construction in the Cosmological Perturbation Theory of the Large-Scale Structure

Monday 7 April 2014 11:35 (20 minutes)

Summary

After the recent observations of the cosmic microwave background (CMB) by the Planck space mission, the next frontier to constrain the parameters of cosmological evolution will rely on the observation of the large-scale structure of the Universe. Upcoming experiments such as EUCLID and LST will be able to measure precisely the signatures of cosmological evolution imprinted in particular on the baryonic acoustic peak in the matter power spectrum of the large-scale structure. However, to extract valuable information on the expansion history of the Universe from these observations accurate theoretical predictions for the matter power spectrum are required. Since N-body simulations of the power spectrum are not feasible for a large variety of cosmological parameters and the existing semi-analytical methods, such as the standard cosmological perturbation theory (SPT), do not provide a sufficient accuracy to model the baryon acoustic peak, the development and improvement of analytical tools in cosmological perturbation theory is of crucial importance. While the loop- corrected SPT predictions overestimate the matter power spectrum around the baryonic acoustic peak compared to the results of numerical simulations, the currently most precise analytical method, the so-called Zel'dovich approximation (ZA) scheme, is harder to perform numerically and underestimates the leading- order power spectrum. I will present an extension of the ZA including an additional term in the perturbative expansion of the power spectrum which matches the ZA to the SPT kernels and hence is expected to lift up the power spectrum towards the exact results. In particular, I will discuss whether the theoretical predictions of this ZA expansion construction up to the one-loop level provide an improvement in the accuracy for modeling the matter power spectrum of the large-scale structure.

Presenter: SAGUNSKI, Laura

Session Classification: Theoretical Particle Physics