GR 3: Kosmologie II

Zeit: Montag 16:40–17:40 Raum: ZHG 002

GR 3.1 Mo 16:40 ZHG 002

Bulk Viscous Universes — •Hermano Velten — Fakultät für Physik, Bielefeld Universität, Bielefeld, Germany

In this contribution we model Cold Dark Matter (CDM) as a non-ideal fluid. Ideal (or perfect) fluids are assumed to be dissipationless. On the other hand, real fluids display dissipative properties. In our model the CDM has an intrisic bulk viscous pressure given by Eckart's formula $p_{\rm v} = -3H\xi$, where $3H$ is the expansion scalar and ξ is the coefficient of bulk viscosity. We explore scenarios where i) the Universe is dominated by the viscous dark fluid (VDF) and ii) only the CDM component of the ΛCDM model behaves as a VDF. We constrain the background dynamics of these models using current astronomical data and we discuss the structure formation process in these scenarios (giving particular attention to the integrated Sachs-Wolfe effect).

GR 3.2 Mo 17:00 ZHG 002

Anatomy of bispectra in general single-field inflation — modal expansions — •Jan Grieb and Thorsten Battefeld — Institut für Astrophysik, Göttingen, Deutschland

Non-Gaussianities are an important probe of the interactions in the very early universe. This work discusses bispectra of single-field inflationary models described by general Lorentz invariant Lagrangians that are at most first order in field derivatives, including the fast-roll models investigated by Noller and Magueijo. We identify the least correlated basic contributions to the general shape and show quantitatively which templates provide a good approximation. Future comparison with CMB observations requires modal techniques for these non-separable bispectra. In the context of this work, we provide a modal expansion employing the formalism by Fergusson et al.

Truncated polynomial modal expansions have restrictions, which we highlight using an example with slow convergence. The particular shape originates from particle production during inflation (common in trapped inflation) and entails both localized and oscillatory features. We show that this shape can be recovered efficiently using a Fourier basis.

GR 3.3 Mo 17:20 ZHG 002

Dynamical cancellation of an arbitrary cosmological constant by vector fields — •Emelyanov Viacheslav — KIT, ITP, Karlsruhe, Germany

The cosmological constant problem (CCP) has two aspects. Firstly, the theoretical estimates of the cosmological constant (CC) and observational data are significantly different. Secondly, one needs to explain its small, but nonzero value. The first CCP motivates us to find a dynamical adjustment mechanism that will compensate the vacuum energy and bring it down to cosmologically acceptable levels. In this talk I would like to present a particular vector model realizing this approach.