

GR 1: Hauptvorträge Kosmologie

Zeit: Montag 14:00–15:30

Raum: ZHG 002

Hauptvortrag GR 1.1 Mo 14:00 ZHG 002
Cosmology from Large-Scale Structure Surveys: Status and Challenges — ●JENS NIEMEYER — Göttingen University, Göttingen, Germany

Complementing measurements of supernova distances and anisotropies in the cosmic microwave background, large galaxy surveys have become important tools for exploring the geometry and matter-energy content of the universe. The next generation of galaxy surveys may potentially open a new window on neutrino masses and the physics of inflation. I will summarize the current status and discuss some challenges for theory and simulations.

Hauptvortrag GR 1.2 Mo 14:45 ZHG 002
Type Ia Supernovae: Models, and their Implication for Cosmology — ●WOLFGANG HILLEBRANDT — MPI für Astrophysik, Garching, Germany

Because calibrated light curves of Type Ia supernovae (SNe Ia) have become a major tool to determine the local expansion rate of the Universe and the nature of the Dark Energy, considerable attention has been given to models of these events over the past years. In this talk recent progress in modeling SNe Ia by means of 3-dimensional hydrodynamic simulations as well as several of the still open questions are addressed. It will be shown that the new models have considerable predictive power which allows us to study observable properties such as light curves and spectra without adjustable non-physical parameters. This is a necessary requisite to improve our understanding of the explosion mechanism and to settle the question of systematic uncertainties in their role as distance indicators for cosmology. In particular, we describe the modeling of SNe Ia as thermonuclear explosions of Chandrasekhar-mass white dwarfs. However, because recent observations of nearby SNe Ia indicate that these explosion models alone cannot explain their diversity alternative scenarios are also discussed together with their consequences for supernova cosmology.