universitätbonn

Verleihung des Promotionspreises 2017

der Stiftung für Physik und Astronomie in Bonn

Fachgruppe
Physik und Astronomie
Universität Bonn

BÜRGER STIFTUNG BONN
Eine Initiative der Sparkasse
Gemeinsam Gutes anstiften!

Programm

14:30 Uhr **Begrüßung**
Prof. Dr. Dieter Meschede
Vorsitzender Fachausschuss Stiftungsfonds

14:35 Uhr **Preisverleihung**

14:40 Uhr **Vortrag des Preisträgers**

Dr. Gerrit Schellenberger
"HICOSMO – A New Baseline for Galaxy Cluster Cosmology"

ca. 15:30 Uhr **Ende**

Anschließend bitten wir unsere Gäste zu einem kleinen Empfang.

Donnerstag, 1. Juni 2017, 14:30 Uhr
Wegelerstraße 10, 53115 Bonn
Großer Hörsaal Mathematik

Vortrag des Preisträgers

HICOSMO – A New Baseline for Galaxy Cluster Cosmology

Galaxy clusters are known to be the largest virialized objects in the Universe. Based on the theory of structure formation one can use them as cosmological probes, since they originate from collapsed overdensities in the early Universe and witness its history. The X-ray regime provides the unique possibility to measure in detail the most massive visible component, the intra cluster medium (ICM).
Using Chandra observations of a local sample of 64 bright clusters (HIFLUGCS) I provide total (hydrostatic) and gas mass estimates of each cluster individually. Making use of the completeness of the sample I quantify two interesting cosmological parameters by a Bayesian cosmological likelihood analysis.
I find the normalized matter density in the Universe, OmegaM, to be 0.3, which implies a Dark Energy consistent with other recent experiments. By combining the cluster total masses and the resulting masses of the hot ICM, I am able to fully break the degeneracy between several cosmological parameters. The main sources of biases that I discuss and account for are (1) the influence of galaxy groups (higher incompleteness in parent samples and a differing behavior of the LM relation), (2) the hydrostatic mass bias (as determined by recent hydrodynamical simulations), (3) the extrapolation of the total mass (comparing various methods), (4) the theoretical halo mass function and (5) other cosmological (non-negligible neutrino mass), and instrumental (calibration) effects.