



Supercomputer simulations of the dark and luminous matter in the Universe.

Tuesday, 30 May 2017, 16:45 h
DESY Auditorium

Volker Springel
(H-ITS Heidelberg)



The Universe features a rather strange composition, with unknown dark matter and dark energy components dominating today's energy density. Early numerical simulations have played a pivotal role in demonstrating that this unexpected cosmological model gives rise to a remarkably successful theory for structure formation. Nowadays, hydrodynamical simulations have become our most important theoretical tool to study non-linear multi-scale dynamics in the baryonic sector, allowing us to follow how hydrogen and helium gases condense out in galaxies, form stars, and populate the predicted dark matter structures. However, we still struggle to understand the regulation of star formation, which appears rather inefficient on a global scale, defying simple theoretical expectations. In this talk, I will review some of the current results of galaxy formation simulations and discuss how they help us to identify and constrain the physics shaping galaxies and clusters of galaxies. I will also discuss results of high precision numerical predictions that help the search for dark matter and are needed in observational programs that aim to constrain the physical nature of dark energy.

- **Coffee, tea and cookies will be served at 16:30h**
- **After the seminar there is a chance for private discussions with the speaker over wine and pretzels**

