Dipartimento di Fisica e Astronomia Galileo Galilei

Colloquia

SPEAKER:

TITLE: **COLLOQUIUM DFA: BENJAMIN WANDELT**

DATE: 11 Apr 2022, 16:40

PLACE: 1/1-1 - Aula "A. Rostagni"

ABSTRACT

Speaker: Benjamin Wandelt Affiliation: International Chair of Theoretical Cosmology, Sorbonne University, Institut d'Astrophysique de Paris and Center for Computational Astrophysics, Flatiron Institute, Simons Foundation, New York Date: 11th April 2022 – 4:40 PM – Aula Rostagni Title: "Machine Learning the Universe: Cosmological Physics and Artificial Intelligence" Registration is mandatory to follow the colloquium in presence. Link: https://indico.dfa.unipd.it/event/292/ For participation in presence the Green Pass is required Zoom Link: https://unipd.link/ColloquiumDFA-11-04-2022 YouTube Link: https://unipd.link/AulaRostagniUniPadovaDFA As cosmologists we wish to learn about the mysteries of the origin, composition, evolution, and fate of the cosmos from all the information the sky has to offer: the cosmic microwave background, galaxy surveys, exploding stars, and reverberations of space-time caused by colliding black holes and neutron stars. How can we distill relevant cosmological information from these data sets? I will argue that this requires nothing less than a new way to connect cosmological theory, simulation, and data. New cosmological tests and advances in Artificial Intelligence (AI) and Machine Learning allow us to design simulation-based, full-physics modeling approaches to cosmology. I will describe the first fundamental insights into cosmological information we have obtained with AI and the current status and challenges of this new way of doing cosmology. I will finish by outlining a path forward that powerfully combines data, theory, computation, Bayesian statistics, and AI. The goal is to reconstruct the detailed initial conditions of the universe at the cosmic beginning, and to probe the formation of cosmic structure and the nature of dark matter and dark energy much more completely than ever before.

Organized by