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# Semi-discrete Optimal Transport for Cosmological Reconstruction

*Tuesday 29 November 2022 15:00 (1h 20m)*

Optimal Transport Theory is a field of Mathematics that describes the cost-effective transfer of probability distributions, and provides connections between probability theory, geometry, partial differential equations, and of course optimisation. Over more than two centuries active research this field has fuelled great advances, and more recently has led to understanding relations with other research fields, such as Computer Science and Physics. In this seminar, I will give an introduction to the main concepts in Optimal Transport, beginning with its original formulation and ending with modern examples of computational tools that allow for the construction efficient algorithms. I will then focus on a particular application in cosmology, the reconstruction of the linear density field from observations of the non-linearly evolved universe. In particular, I present results that show the efficient and accurate reconstruction of Baryonic Acoustic Oscillations from the late-time distribution of matter.

**Presenter:** VON HAUSEGGER, Sebastian (University of Oxford)