



PHYSICS COLLOQUIUM:

New Insight into Cosmology and the Galaxy-Halo Connection from Non-Linear Scales

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About The Speaker:

Born and raised in the Netherlands, Prof. van den Bosch received his PhD from Leiden University, where he worked on constraining the masses of supermassive black holes in the nuclei of elliptical galaxies. As a postdoctoral researcher, he transitioned to working on galaxy formation theory, first as a Hubble Fellow at the University of Washington and later as a research associate at the MPA near Munich.

From 2003 to 2009 he was the leader of research groups, first at the ETH in Zurich and then at the MPA in Heidelberg. During this period, in collaboration with Houjun Mo and Simon White, he wrote the textbook *Galaxy Formation and Evolution*, and started working on cosmology and large scale structure, developing methods to model the galaxy-halo connection. In 2009 he moved back to the USA, first briefly as an associate professor at the University of Utah, and starting 2010 as a professor at Yale. He continues to work on a broad variety of topics, including dark matter substructure, non-equilibrium dynamics, large scale structure, and galaxy formation.

Abstract:

In our LCDM paradigm, galaxies form and reside in dark matter halos. Establishing the (statistical) relation between galaxies and dark matter halos, the 'Galaxy-Halo connection', therefore gives important insight into galaxy formation, and also is a gateway to using the distribution of galaxies to constrain cosmological parameters. After a brief introduction to how clustering and gravitational lensing can be used to constrain the galaxy-halo connection, I show that several independent analyses all point towards a significant tension in cosmological parameters compared to the recent CMB results from the Planck satellite. I discuss the potential impact of assembly bias, and present satellite kinematics as a complementary and competitive method to constrain the galaxy-halo connection. After a brief historical overview of the use of satellite kinematics, I present a novel analysis, and show how it improves our knowledge of the galaxy-halo connection. I end with a re-examination of the cosmological tension, this time using satellite kinematics rather than gravitational lensing.

Date:

10/29/2021

Time:

10:30 AM-11:50 AM

Link:

Please contact
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information.

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