

**THE UNIVERSITY OF HONG KONG**

*DEPARTMENT OF PHYSICS*

*RESEARCH SEMINAR*

# **Dark Energy and Neutrino Mass – the Latest Hints from DESI Using Baryon Acoustic Oscillations**

**Dr. Jiaxi YU**

*Kavli IPMU, University of Tokyo*

Abstract:

The DESI collaboration (Dark Energy Spectroscopic Instrument) confirmed its groundbreaking results on dynamical dark energy through the largest 3-dimensional Universe map it observed. This talk highlights how DESI Data Release 2 further challenges the  $\Lambda$ CDM paradigm, the standard cosmology for the past 30 years. DESI's Baryon Acoustic Oscillation (BAO) measurements reveal a  $2\text{--}4\sigma$  preference for dynamical dark energy, particularly when combined with external cosmic microwave background (CMB) data and Supernovae Ia (SNIa) data. Additionally, DESI sets the tightest upper limit on neutrino mass ( $\Sigma m\nu < 0.064\text{eV}$ ) under  $\Lambda$ CDM, though the posterior distributions intriguingly favour negative values. The dynamical dark energy model relaxes neutrino mass constraints and leaves open the possibility of inverted mass ordering. DESI will release its findings on cosmological parameters and primordial non-Gaussianity with its DR2 in the coming year. These results will further improve our understanding of the dark energy nature, neutrino mass ordering and early-Universe physics.

This talk will also include Jiaxi's contribution to these results, particularly through studies of the galaxy-dark-matter-halo connection and the spectroscopic systematics of emission-line galaxies. These are essential to ensure robust cosmological measurements from massive redshift surveys.

Biography:

Jiaxi Yu is a fellowship postdoc at Kavli IPMU in Japan. Her research interests are observational cosmology, large-scale structure and redshift surveys. Jiaxi obtained her PhD in astrophysics from EPFL in Switzerland under the supervision of Professor Jean-Paul Kneib. She is active in several major international collaborations, including the Dark Energy Spectroscopic Instrument (DESI), the Prime Focus Spectrograph (PFS), and the MULTiplexed Survey Telescope (MUST), with memberships that are portable to institutions outside the collaborations. Her research on the galaxy-dark-matter-halo relation bridges astrophysical modelling and precision cosmology, while her structured work of spectroscopic systematics in emission-line galaxies further enhances the robustness of DESI cosmological results.

**Wednesday, April 29, 2026, 1:00pm**

MW103, 1/F, Meng Wah Complex, The University of Hong Kong

Department of Physics, Chong Yuet Ming Physics Building, The University of Hong Kong

*Phone: 39172360 Fax: 25599152. Anyone interested is welcome to attend.*