

## **Title: Dynamics of exoplanet atmospheres - observational results and challenges**

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Over the past decade, the study of atmospheric dynamics in exoplanets has evolved from a theoretical curiosity to a data-driven field. We are now entering an era where transport processes can be directly or indirectly constrained by observations. In this talk, I will review the current observational landscape of atmospheric dynamics, focusing on the mechanisms that drive the redistribution of heat, angular momentum, and chemical species in giant exoplanets.

I will highlight key insights from space-based phase curves, which trace the large-scale circulation of hot Jupiters, and showcase recent breakthroughs from high-resolution ground-based spectroscopy. These include the detection of time-variable wind signatures and compositional gradients, offering unprecedented views into the three-dimensional nature of exoplanetary atmospheres.

Finally, I will outline the major observational challenges that lie ahead as we prepare for the next generation of targets from PLATO and their detailed atmospheric characterisation with Ariel and the ELT. With increasing precision and temporal resolution, atmospheric dynamics is poised to become a central pillar in our understanding of planetary formation, evolution, and climate.