

## Detection and Dynamics of Exoplanets (DDE): Interplay between theory and observations



Contribution ID: 144

Type: **not specified**

## Exomoons, exorings, and other exotica

*Tuesday 8 July 2025 09:00 (30 minutes)*

Since the first exoplanets were found, astronomers have speculated about the possibility of detecting other minor bodies and effects associated with these worlds. Each of these promises to unlock new insights into exoplanets which would be otherwise inaccessible, such as their obliquity, internal structure and details of their history and evolution. In this talk, I will summarise what progress has been made in the search for a myriad of such effects, in particular exomoons, exorings, trojans and planetary oblateness. Each poses unique detection challenges but in the JWST-era I argue they should certainly be at last detectable. Exomoons has enjoyed perhaps the greatest attention in the literature, with dozens of methods now proposed for their detection, and candidates announced too. Arguably the greatest issue facing this emerging field is the lack of a truly convincing detection, which would likely need to be a moon akin to those found in the Solar System to gain widespread acceptance. Exorings have long been sought after, but are often overlooked. I highlight how most modern precision light curve detrending methods would remove ring signatures by design, and planets with large projects ring areas could even be classified as false-positives. Trojans, like moons, have been sought using statistical stacking approaches, as well as individual searches, but I highlight the precarious nature of the former approach. Finally, planetary oblateness offers perhaps the most promising and likely exotica to expect near-term detections, with candidate detections already in the literature and with the potential to unlock planet-orbit obliquity measurements.

**Presenter:** KIPPING, David (Columbia University)

**Session Classification:** Exomoons, exorings, and trojan systems