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



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Precise Mass Refinement of Three Sub-Neptune Systems from Radial Velocity Observations

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The characterization of exoplanetary masses is essential for understanding their composition and potential for atmospheric studies. The Tracking Hydrates In Refined Small Transiting Exo-Earths (THIRSTEE) programme aims to study the composition of sub-Neptunes planets. THIRSTEE is searching the answers about the composition and formation of these planets around M dwarfs or Sun-like stars, their relative occurrence, and how it dependes on other system properties. We present a detailed radial velocity analysis of three planetary systems: K2-314, K2-180, and TOI-836, all hosting sub-Neptune-sized planets ($R \sim 4 R_{\oplus}$). Using new high-precision spectroscopic data from ESPRESSO, HARPS, and HARPS-N, we refine planetary masses with a precision better than 15%. These refined mass measurements provide key insights into the internal structure and bulk composition of these planets. Additionally, we evaluate their suitability for atmospheric characterization with JWST. This study will not only improve the accuracy of mass determinations, but will also increase our knowledge of the formation and composition of sub-Neptunes, which characterise the population of candidate waterworlds.

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