

The discovery odyssey of TOI-1260 –a new TESS system of hot mini-Neptunes

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Statistical studies of exoplanet populations have shown that planets in the 2-3 R_{\oplus} size range, the so-called mini-Neptunes, are one of the most common types of planets.

In this talk I will highlight some of the challenges associated with the detection and characterisation of such planets in transit and radial velocity timeseries as illustrated by the case of the TOI-1260 system. TOI-1260 is a K6V star hosting two mini-Neptunes in tight orbits, and a likely outer planet of a similar size. The star is moderately active with a complex activity pattern, which necessitated the use of the relatively novel method of Gaussian process regression guided by suitable activity indicators to disentangle the stellar-induced signal from the planetary signals. The TOI-1260 planets are thus revealed to have bulk densities which do not allow for the planets' compositions to be uniquely determined, making these mini-Neptunes classic examples of the structure and composition degeneracy typical for the 2-3 RR_{\oplus} range.

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