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# Detecting transiting exoplanets' atmospheric signatures

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## Abstract

Among the 400-plus exoplanets discovered to date, an ever-growing sample of the transiting variety present themselves as good targets for further characterisation. Using transmission (when the planet eclipses its host star) and emission (the day-side thermal emission of the exoplanet) spectroscopy it is possible to study the atmospheric compositions of these so-called "hot Jupiters" in more and more detail. The feasibility of such measurements has been demonstrated with great success using Spitzer and HST in the recent years. Most notable are the detections of molecular species such as water, methane, carbon monoxide and dioxide in the near infra-red for a variety of planets. These detections allow us to build up an intricate picture of the atmospheric compositions and dynamics present. At the end of the Spitzer cold-phase, a gap in space-based observatories in the near- to mid-infra-red has emerged, calling for increased efforts in ground-based techniques. With the detection of methane in fluorescence, in the L-band, on HD 189733b, it has been shown that such measurements using medium-sized telescopes on the ground are feasible. With the steady improvements in statistical analysis methods, we are able to push ground-based, near-infrared spectroscopy to increasingly higher resolutions, allowing us to obtain a more intricate picture of the exoplanets' atmospheric compositions than ever before.

At this conference, I will give an overview of what has been done from the space and ground, what we have learned from these observations, and how to build upon our results in future developments.