ARIEL

Giovanna Tinetti*†[1] and Ariel Consortium

[1]University College London - London's Global University (UCL) – Gower Street - London, WC1E 6BT, United Kingdom

Abstract

Nearly 2,000 exoplanets have been discovered and missions by ESA and NASA from space such as GAIA, Cheops, PLATO, K2 and TESS will increase this number to tens of thousands. Of all these exoplanets we know very little, i.e. their orbital data and, for some of these, their physical parameters such as their size and mass. Pioneering measurements using transit spectroscopy with Hubble, Spitzer and ground-based facilities have enabled the detection of a few of the most abundant ionic, atomic and molecular species and to constrain the thermal structure of a few planets. Future large, general purpose facilities will allow the acquisition of better exoplanet spectra than are currently available, especially from fainter targets. A few tens of planets will be observed with JWST and E-ELT in great detail. A breakthrough in our understanding of planet formation and evolution mechanisms will only happen through the observation of the planetary bulk and atmospheric composition of a statistically large sample of planets (_˜500). This requires conducting stable spectroscopic observations from a dedicated agile space mission, covering simultaneously a broad spectral region from the visible to the mid-IR, over 3.5 years. The ESA-M4 mission candidate ARIEL is designed to accomplish this goal and will provide a complete, statistically significant sample of gas-giants, Neptunes and super-Earths with temperatures hotter than 600K, as these types of planets will allow direct observation of their bulk properties, enabling us to constrain models of planet formation and evolution. The Ariel consortium currently includes academic institutes and industry from eleven countries in Europe; the consortium is open and invites new contributions and collaborations.

*Speaker

†Corresponding author: g.tinetti@ucl.ac.uk