Exoplanetary Characterisation Observatory (EChO)

Ingo Waldmann and Giovanna Tinetti

University College London, Physics & Astronomy, London, United Kingdom (ingo@star.ucl.ac.uk)

The science of extrasolar planets is one of the most rapidly changing areas of astrophysics and since 1995 the number of planets known has increased by almost two orders of magnitude. A combination of ground-based surveys and dedicated space missions has resulted in 800-plus planets being detected, and over 2000 that await confirmation. NASA's Kepler mission has opened up the possibility of discovering Earth-like planets in the habitable zone around some of the 100,000 stars it is surveying during its 3 to 4-year lifetime. The new ESA's Gaia mission is expected to discover thousands of new planets around stars within 200 parsecs of the Sun. The key challenge now is moving on from discovery, important though that remains, to characterisation: what are these planets actually like, and why are they as they are?

The Exoplanet Characterisation Observatory (EChO) is a space mission dedicated to undertaking spectroscopy of transiting exoplanets over the widest range possible and is currently being studied by ESA in the context of a medium class mission within the Cosmic Vision programme for launch post 2020. The mission is based around a highly stable space platform with a 1.2 m class telescope at L2, hosting a suit of spectrographs providing continuous spectral coverage from 0.5 to 16 microns. Such a broad and simultaneous wavelength coverage allows the unique insight into the atmospheric make up of these foreign worlds and allows us to study their planetary and atmospheric compositions and evolutions.