

The EChO Instrument

Paul Eccleston – RAL Space, Oxford, UK

The science of extra-solar planets is one of the most rapidly changing and exciting areas of astrophysics. Since 1995 the number of planets known has increased by almost two orders of magnitude. The Exoplanet Characterisation Observatory –EChO– will take us to a new phase where we begin to understand the physics and chemistry of these objects and, possibly, the detection of the signatures of life on other habitable planets. The ability to repeatedly observe exoplanets over a very extended wavelength range in a single run gives EChO a unique capability unmatched by any current or proposed mission.

The payload instrument is provides simultaneous coverage from the visible to the mid-infrared and must be highly stable and operate as a single instrument. In this presentation I shall describe the integrated payload design for EChO which will cover up to the 0.4 to 16 micron wavelength band. The instrumentation is subdivided into 4 channels (Visible, Short Wave InfraRed, Mid Wave InfraRed and Long Wave InfraRed) with a common set of optics spectrally dividing the field of view via dichroics. I shall discuss the significant design issues for the payload and the detailed technical trade-offs that have been undertaken to produce a payload for EChO that can be built within the mission and programme constraints and yet which will meet the exacting scientific performance required to undertake transit spectroscopy. This presentation will provide the overall view of the instrument architecture and design, with other presentations going into more detail on the detailed design of specific aspects and on the predicted performance.