

## Tuesday Morning

### **ARIEL - Science and overview of ESA's mission to study the nature of exoplanets**

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Since the 1990-ies thousands of exoplanets have been discovered. They orbit stars with different properties, and they display a great diversity of physical parameters and planetary system architectures.

The next logical and necessary step in exoplanet science is to independently measure chemical composition of exoplanets. This will enable them to be better modelled, which will allow addressing fundamental questions regarding their nature, in particular what they are made of, how they formed, and how they have evolved to what we observe today, and how this was affected by their parent stars.

The Atmospheric Remote-Sensing Infrared Exoplanet Large-survey (ARIEL) mission has been recently selected by ESA as M4 in the Cosmic Vision programme for a 2028 launch. It will enable this next step in exoplanet science, by performing measurements of chemical compositions of their atmospheres. It will be devoted to observing a large population (many hundreds) of diverse known preferentially warm and hot transiting planets, opening a new discovery space in the field of extrasolar planets and enabling the understanding of the physics and chemistry of these far away worlds.

The observations will probe atmospheric chemistry and dynamics, by means of infrared spectroscopy (1.25-7.8  $\mu\text{m}$ ) and visible/NIR photometry in three bands (0.5-1.2  $\mu\text{m}$ ) with an off-axis Cassegrain telescope having a 1.1 x 0.7 m aperture. Both transit and eclipse/ occultation spectroscopy will be employed to obtain transmission and emission spectra. The photometry provides thermal and scattering properties and monitors stellar activity.

Regular timely public releases of high quality data products at various processing levels will be provided throughout the mission.

In this talk I will provide an overview of the ARIEL science objectives, and briefly outline the mission.

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