Exploring exo-Venus atmospheres

How to cite:

For guidance on citations see FAQs.

© Agnibha Banerjee

https://creativecommons.org/licenses/by/4.0/

Version: Poster

oro.open.ac.uk
Exploring Exo-Venus Atmospheres

Agnibha Banerjee

Venus

Properties:
- Similar to Earth in size and mass
- Dense clouds made mostly of Sulphuric Acid
- Hottest planet in the solar system
  (runaway greenhouse effect)
- Atmosphere contains mostly CO₂
- Extreme air pressure at surface

Transmission Spectroscopy

When an exoplanet passes in front of its host star along our line of sight, it partially blocks some of the star's light (Transit).

During this, some starlight goes through the planet's atmosphere and gets absorbed by the gases in it.

The light that passes through the atmosphere eventually reaches our telescope.

This is light is split into different wavelengths (or colours).

More light is seen in some wavelengths than others. These differences contain a fingerprint of any absorbing gases and aerosols that are present.

My Project

So far, transmission spectroscopy has only been possible for gas giants with atmospheres dominated by Hydrogen and Helium, as the signal from terrestrial planets is very small.

The James Webb Space Telescope (JWST), launched on 25 Dec 2021, to perform such measurements for Earth-sized exoplanets. Among these will be a population of planets with temperatures similar to that of Venus, and therefore modelling tools specific to these types of atmospheres must be developed in order to interpret the observations.

Venus is very similar to Earth in terms of its size and mass, yet its evolutionary history has culminated in an incredibly hot, acidic and inhospitable world. Studying Venus-like planets around other stars will help us to understand how this might have happened.

Exo-Venus: Comparing the JWST observations with the detailed information we have for Venus itself will provide insights into the uniqueness of Venus's evolution. In turn, Venus can be used as to benchmark our expectations of Venus-like exoplanets.