

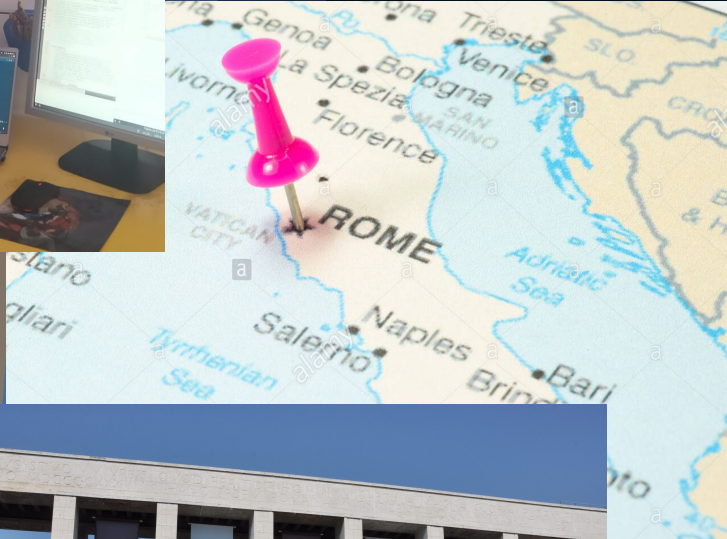
PhD project: “Cloud formation and cloud properties on Earth and in exoplanets”

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KØBENHAVNS
UNIVERSITET

Something about myself



Background:

- Bsc in Physics at Sapienza University (Rome)
- “SPLASHY” project
- Msc in **Astronomy and Astrophysics** at Sapienza University (Rome)

Current position: **PhD** student at KU

Scientific interests



Planets and **exoplanets**



(Exo-) **atmosphere**



Cloud formation and climate models



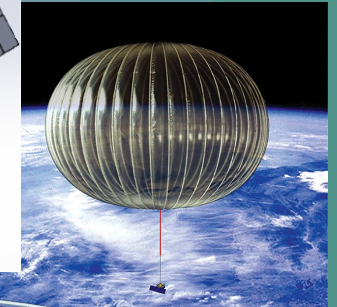
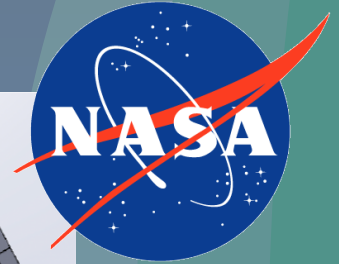
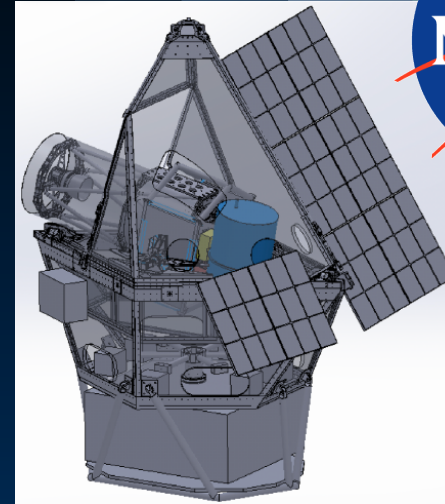
Master thesis project

Science case:

- Observation of exo-atmospheres with **EXCITE** - EXoplanet Climate Infrared Telescope

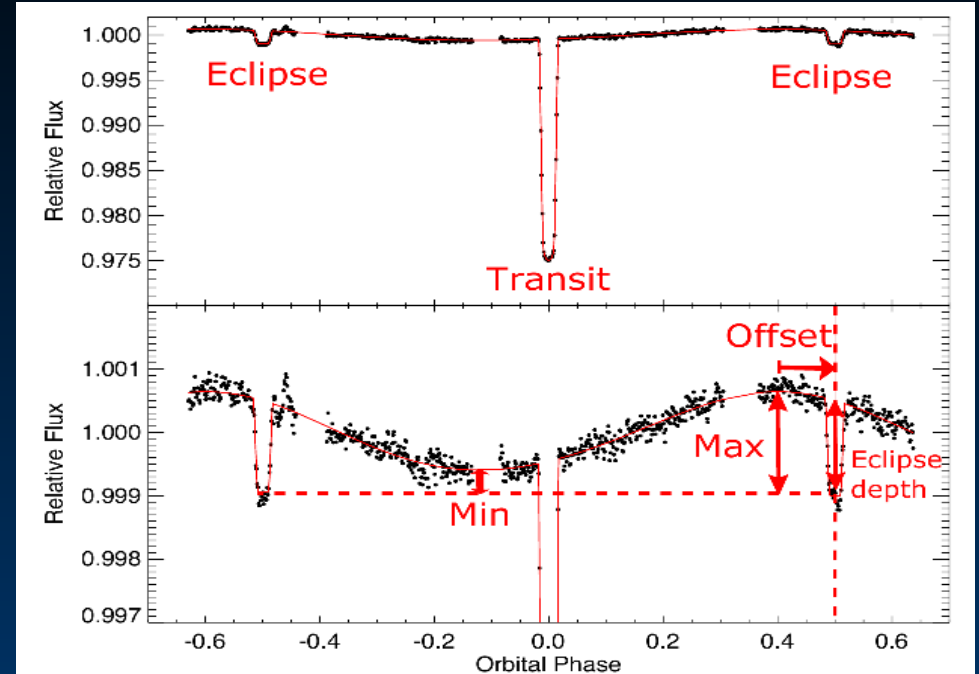
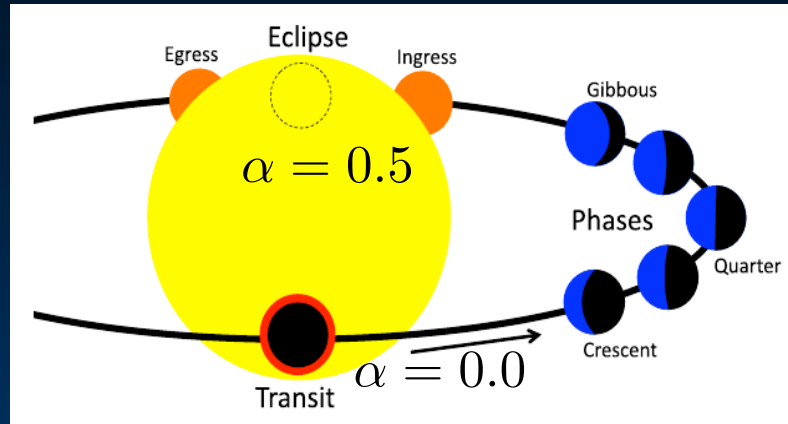
Tasks:

- Selection of targets
- Feasibility of phase curve spectroscopy of Hot Jupiters
- Preliminary analysis of typical systematics affecting balloon-borne telescopes
- Design the logo



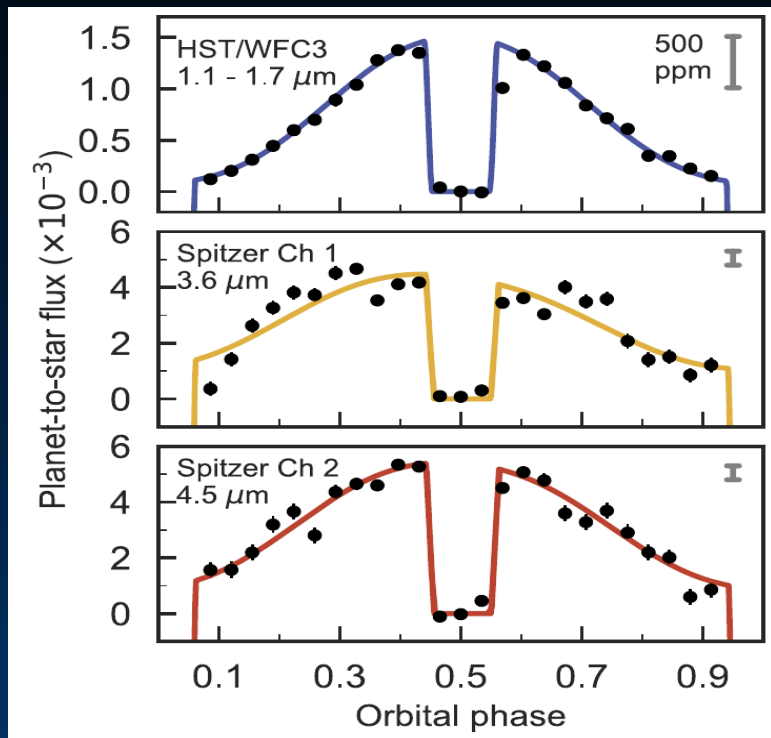
Phase curve of a planet

Phase curve: planet flux variations as a function of the position along the orbit (phase angle α)



Phase curve example Parmentier et al. 2018

Phase curve spectroscopy



Spectroscopic phase curves of WASP-103b - Kreidberg et al. 2018

Planet spectrum

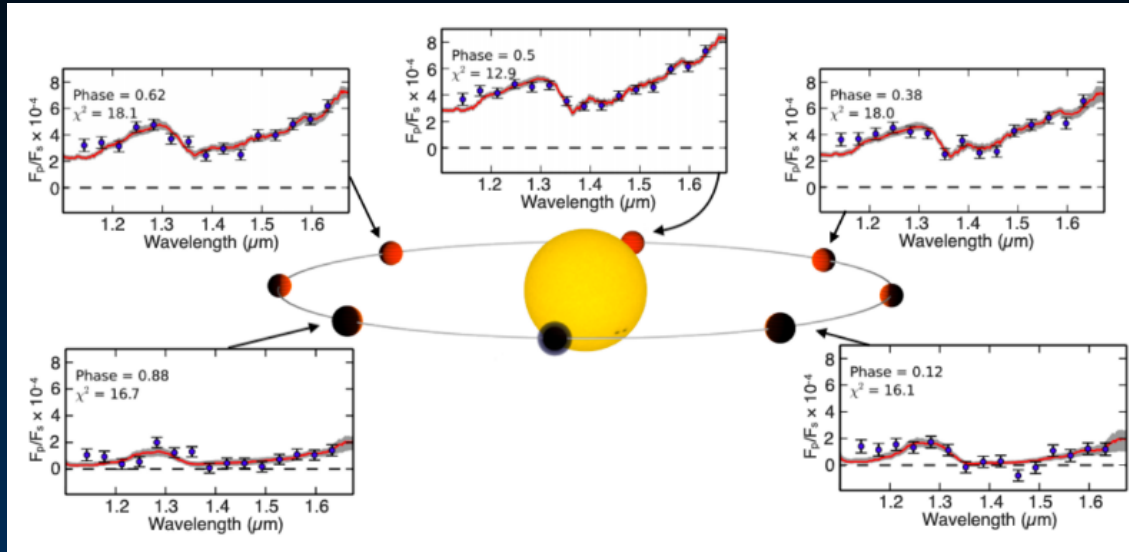
- VIS \rightarrow reflected star light (albedo, presence of clouds/aerosols)
- IR \rightarrow thermal emission (molecular transitions)

Phase curve spectroscopy

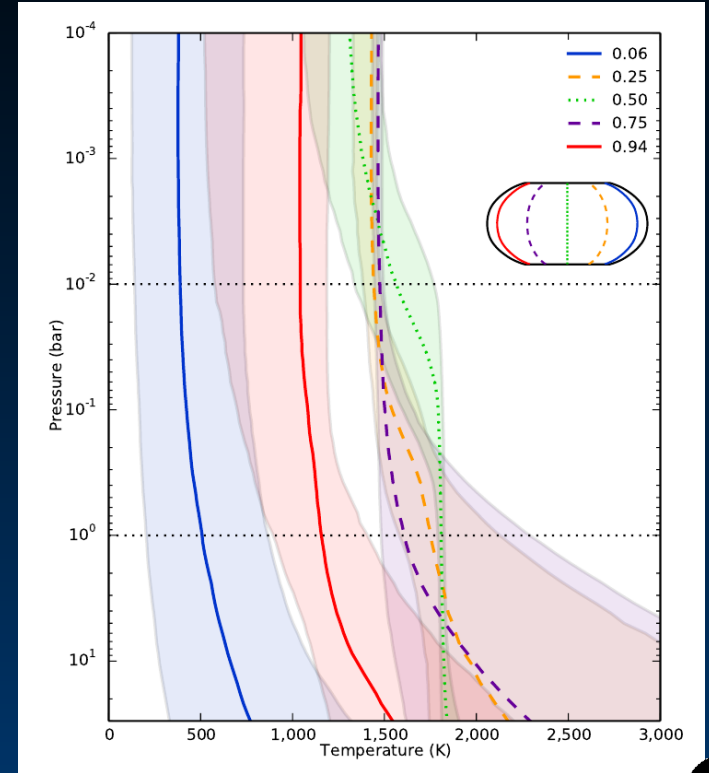
- Chemical composition
- Energy balance

Phase-resolved spectroscopy

Planet spectrum at different orbital phases



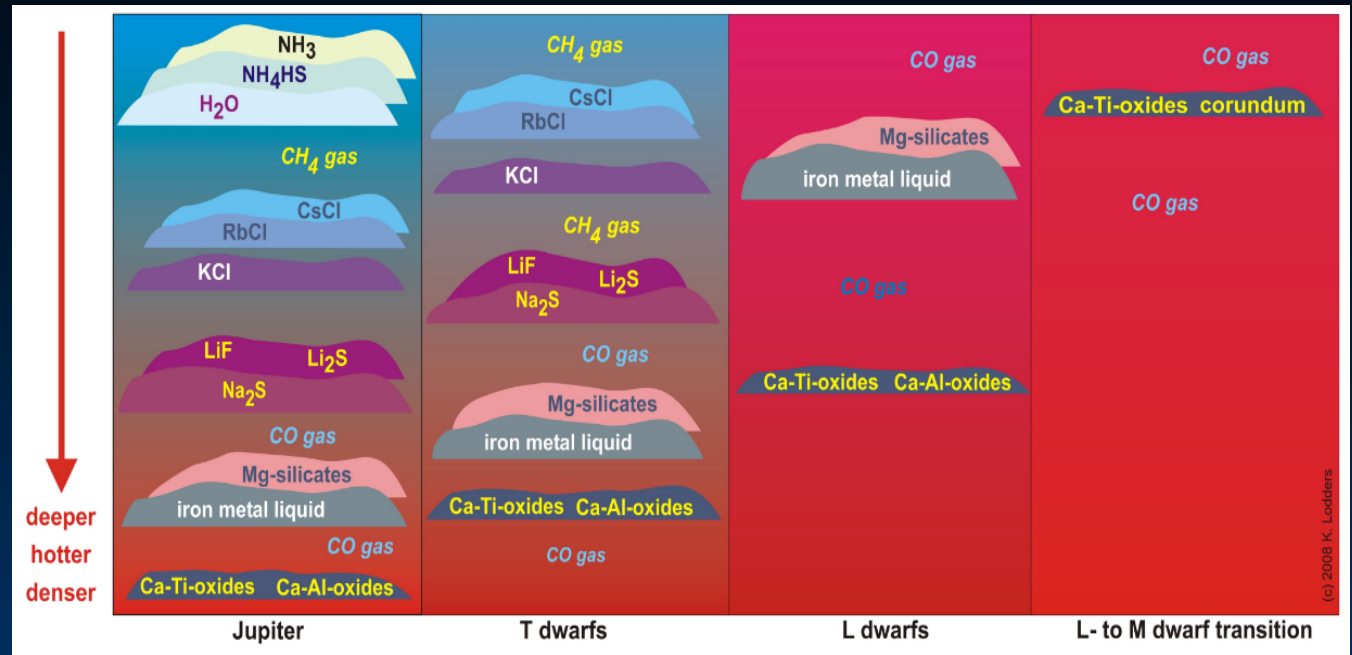
Longitudinal and vertical structure of the atmosphere \rightarrow thermal profile, detailed thermodynamics



T-P profile at different orbital phases

EXCITE science return

- 3D structure of the atmosphere
- Climate dynamics
- Brown dwarf-like transitions(?)



Accurate atmospheric models including **cloud formation are required!**

PhD project

- Topic: **Atmosphere and climate modeling**
- Goal: better understanding of climate dynamics of exoplanets through the study of cloud formation and properties
- How I want to proceed after my Msc:

Expand my knowledge of atmospheric and climate models

Improve my computer programming skills

Dedicate my research to cloud formation and cloud properties

Thanks for your attention!

