Direct detection of exoplanets with MIRI on the James Webb Space Telescope

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Imaging Exoplanets



Mid-IR advantages:

- **Reduced contrast** between the star and the planet
- Peak of emission of young giant planets
- Relevant for the detection of **molecular signatures** present in their atmospheres

Need spatial instruments !

<u>Challenge:</u> Direct imaging requires very high contrast at small angular separations.

Favorable cases

- \rightarrow Young giant planets
- \rightarrow Distant from their host star
- \rightarrow IR Observations



Mid Infrared Instrument

<u>JWST</u>: 4 instruments including <u>MIRI</u> (Mid-IR Instrument)

 \rightarrow Spectral range from 5 to 28 μm

 \rightarrow First data available for direct imaging above 5 μm finally available !









Launch on Christmas Day 2021 Crédit : A. Hara

First results on imaged exoplanets with MIRI

 MIRI coronagraphs
 MIRI Medium Resolution Spectrometer

 First imaged exoplanet in mid IR : HIP 65426 b
 Planetary-mass companion spectrum : VHS 1256 b



Carter et al. (2022)

Miles et al. (2022)

How to observe and **characterize** companions that are less bright and closer to their star ?

Detection of molecules



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