

Exploring the Solar System IV – Exoplanets



Exploring the Solar System IV

Exoplanets

Why Look For Exoplanets?

Finding Exoplanets

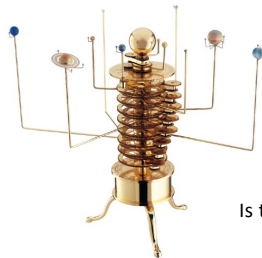
Looking For Life

What Next?



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Why Look For Exoplanets?



Is our solar system typical?

Are there other planets like the Earth?

Is there life elsewhere in the galaxy?

Studying other solar systems will help us understand our own



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Finding Exoplanets

Planets orbiting other stars can be found by various methods

Discovery Method

Radial Velocity

Transits

Direct Imaging

Microlensing

Astrometry

Method Looks For ...

Wobble

Shadows

Dots in images

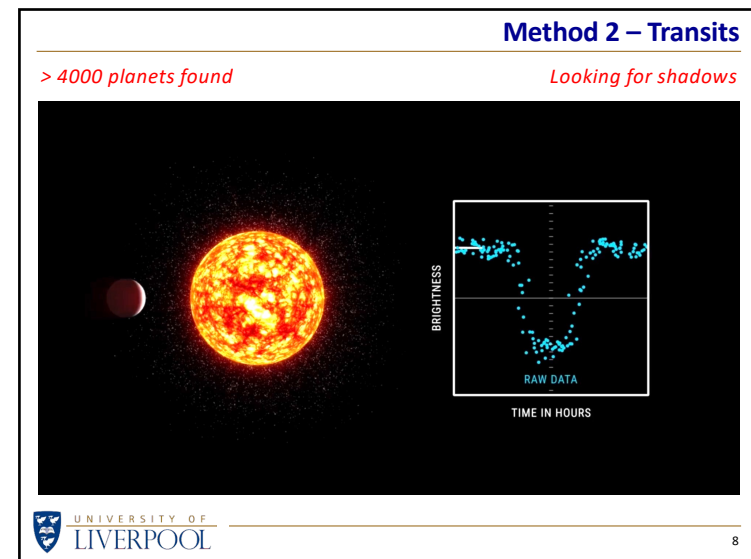
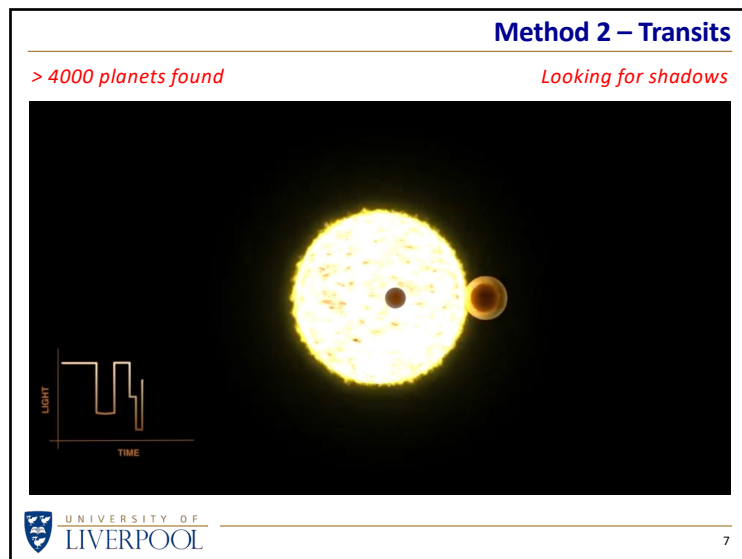
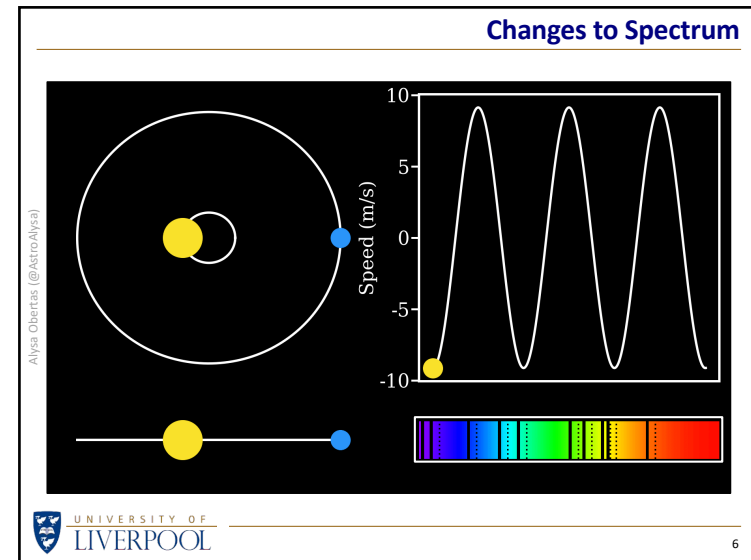
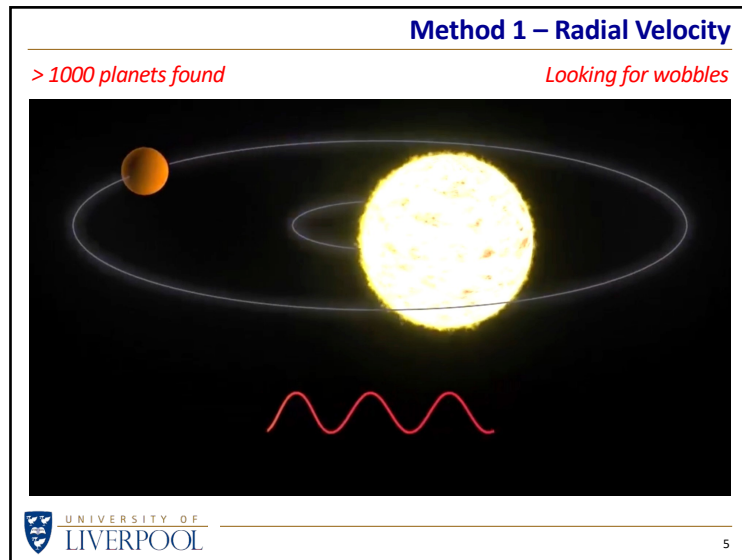
Bending of light

Motion of stars

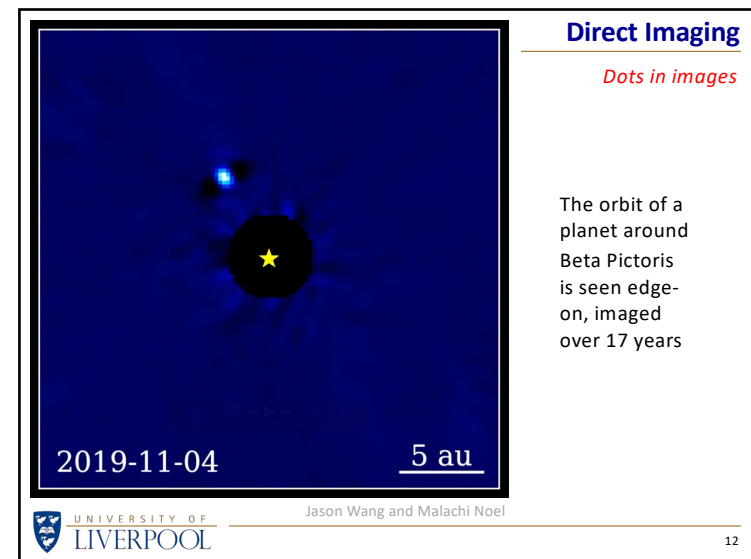
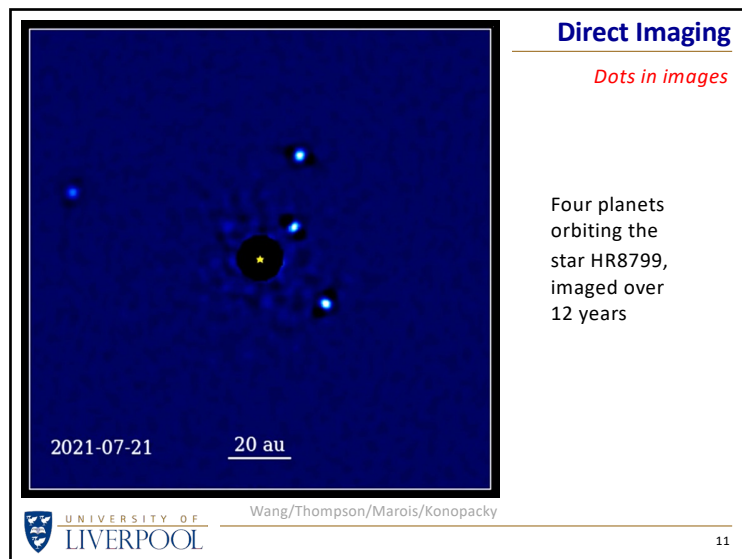
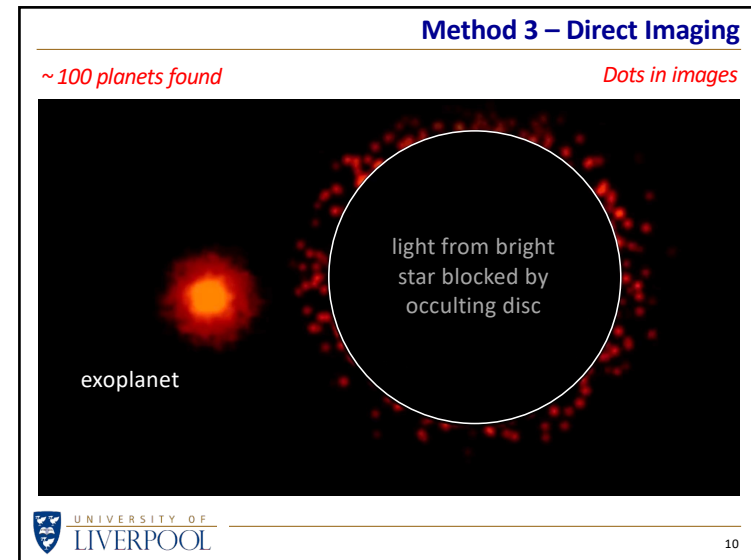
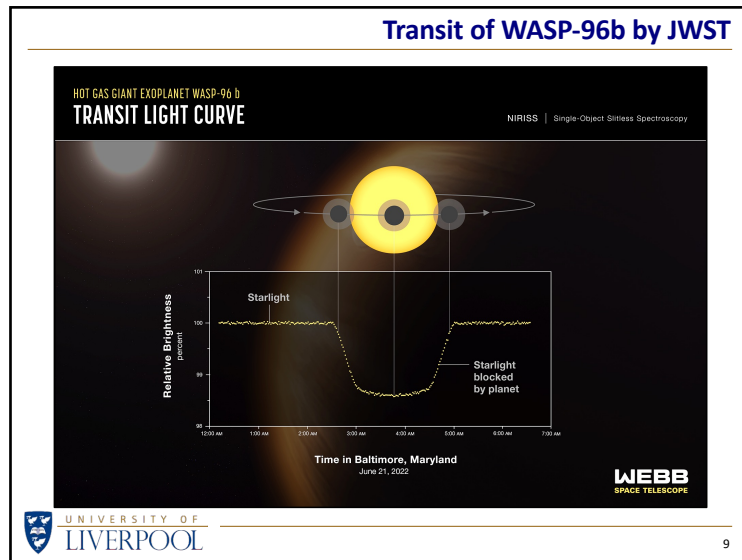


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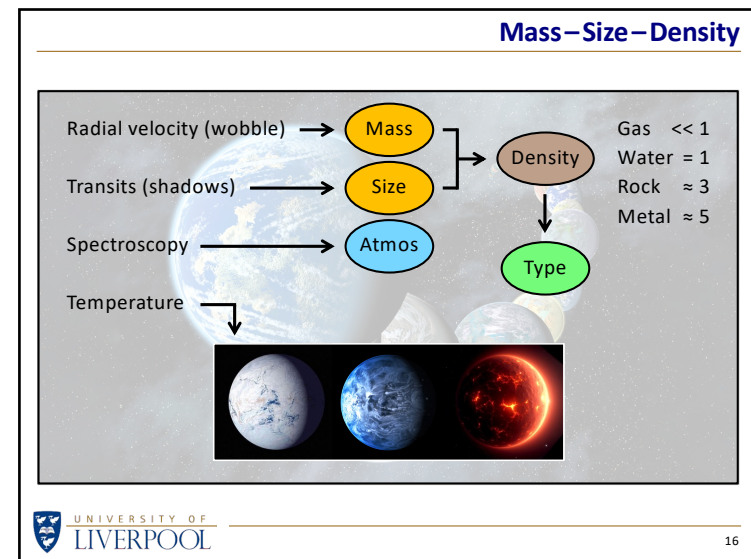
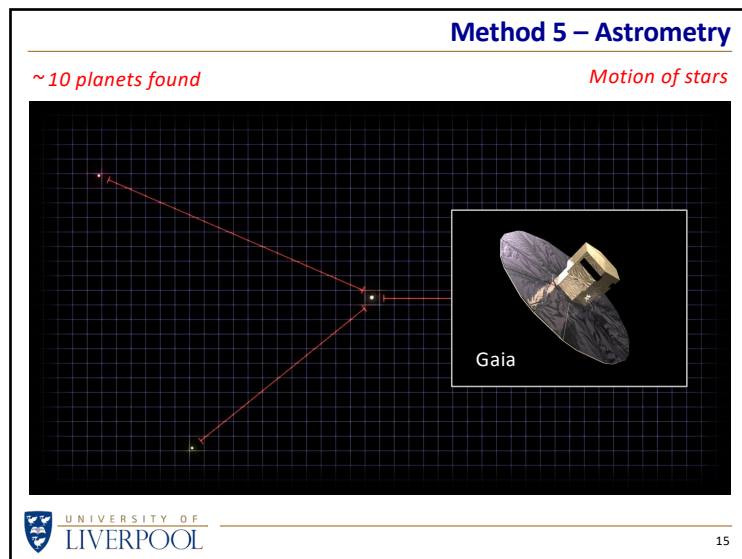
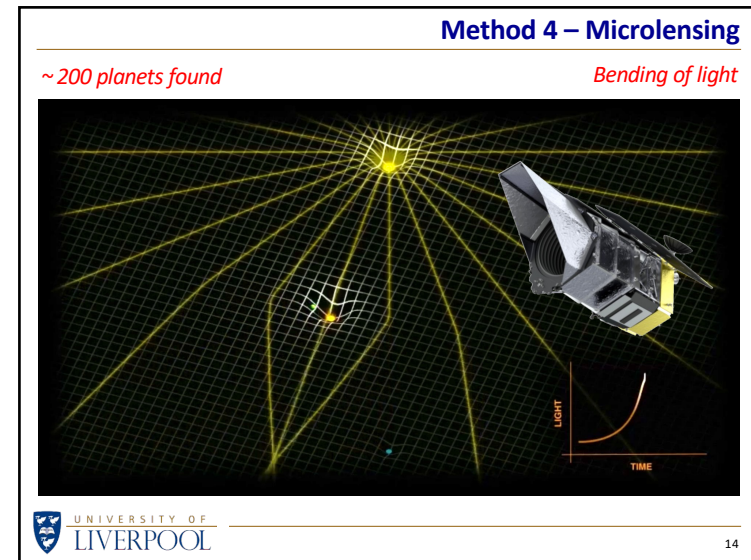
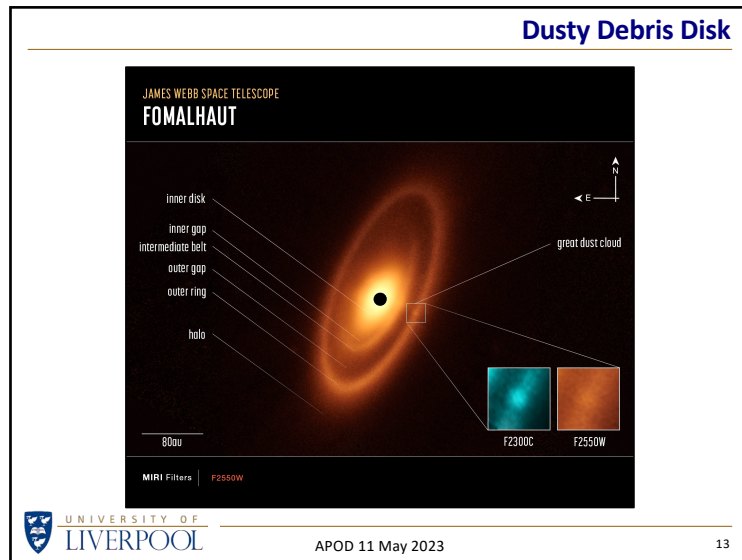
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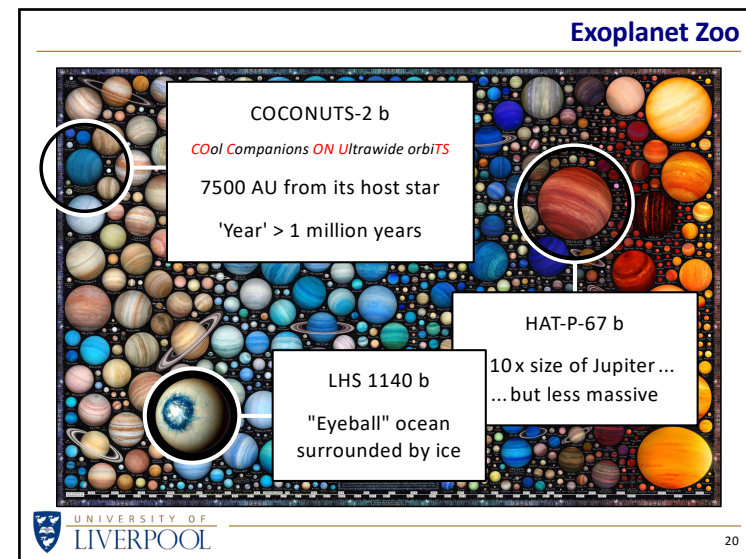
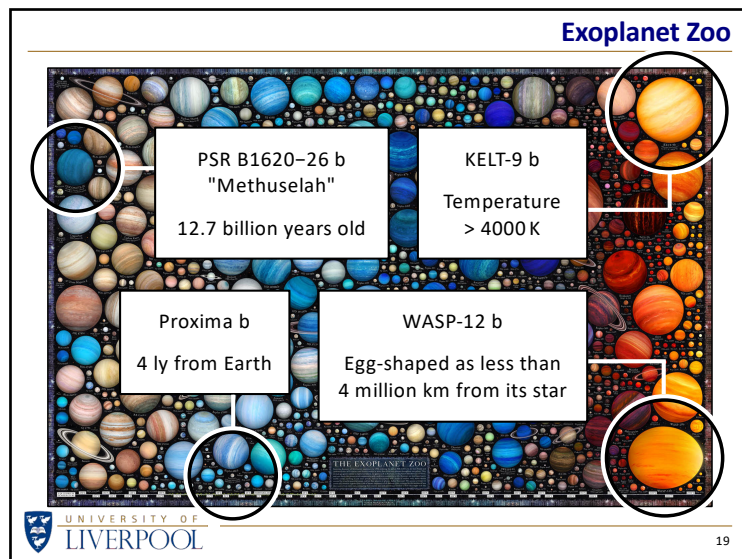
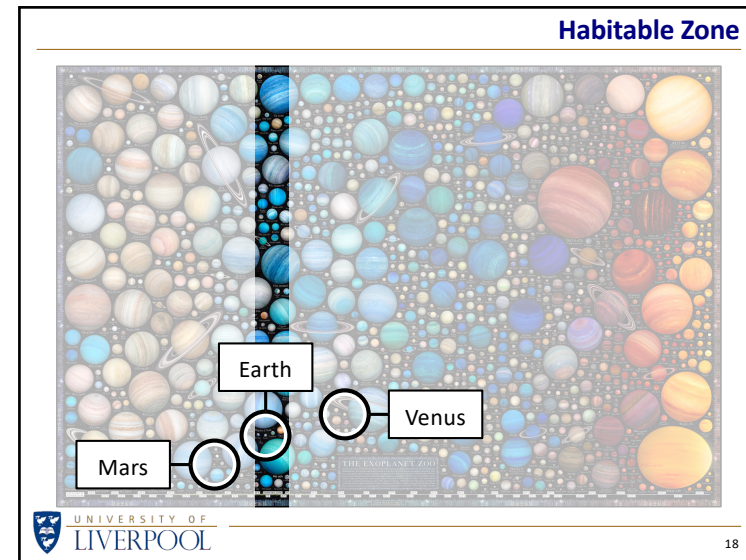
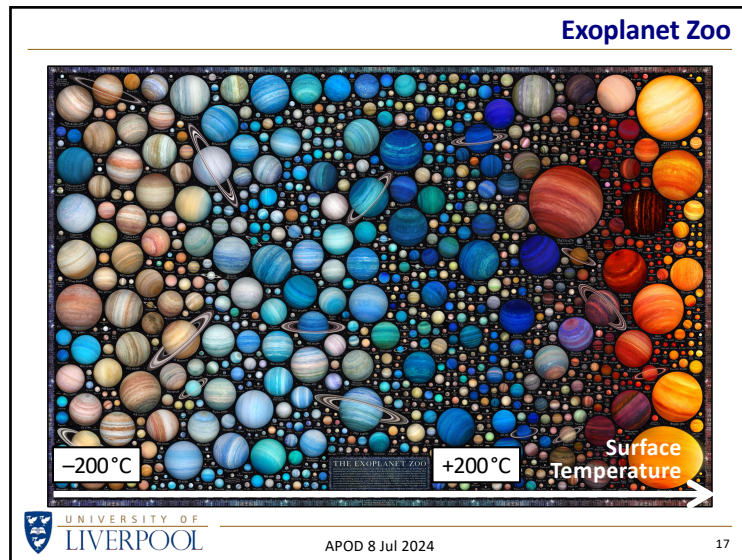
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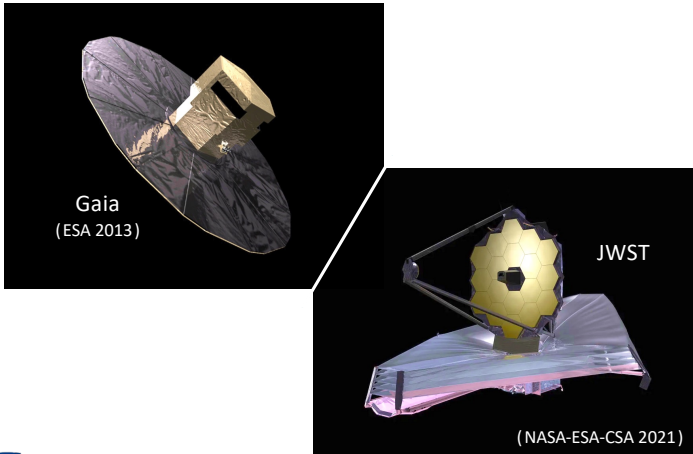


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Exoplanet Missions



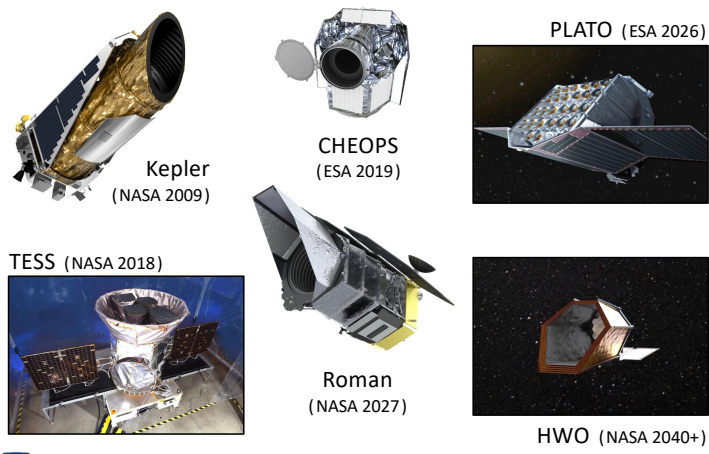
Gaia (ESA 2013)

JWST (NASA-ESA-CSA 2021)

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Exoplanet Missions



Kepler (NASA 2009)

CHEOPS (ESA 2019)

PLATO (ESA 2026)

TESS (NASA 2018)

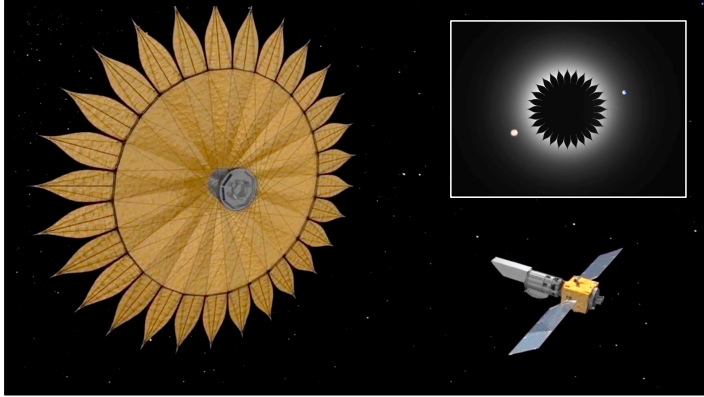
Roman (NASA 2027)

HWO (NASA 2040+)

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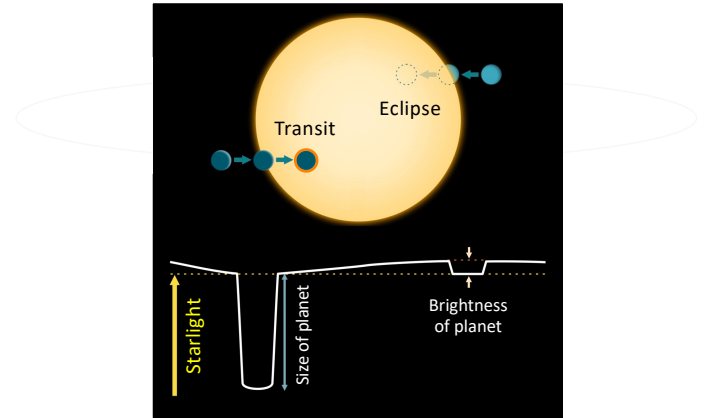
Star Shade Concept



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Looking For Life



Transit

Eclipse

Starlight

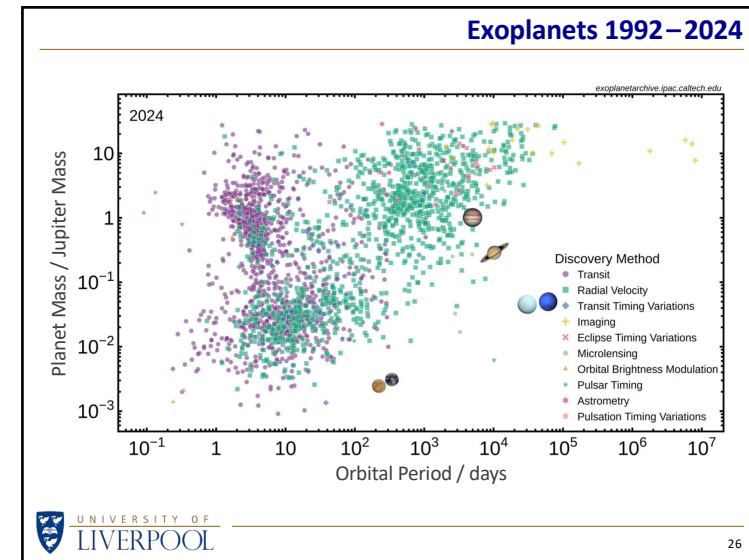
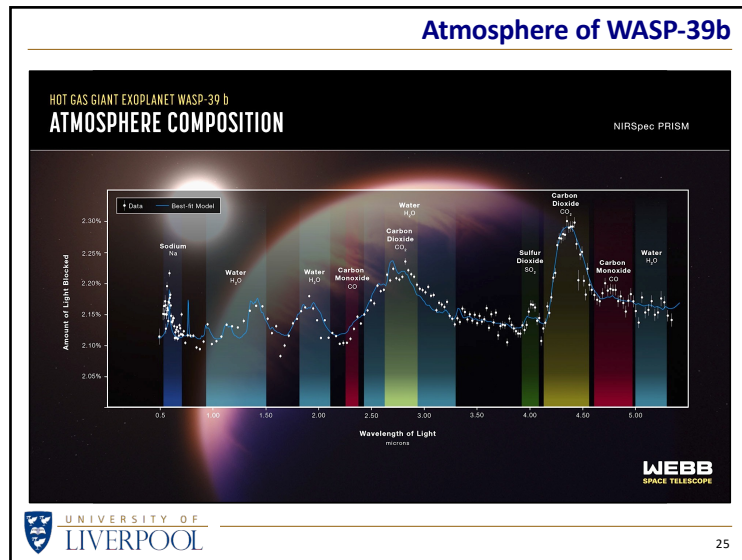
Size of planet

Brightness of planet

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Want To Know More?

NASA Discovery Dashboard:
science.nasa.gov/exoplanets/discoveries-dashboard

NASA Exoplanet Archive:
exoplanetarchive.ipac.caltech.edu



PLATO 2026
sci.esa.int/web/plato



Roman 2027
roman.gsfc.nasa.gov



HWO 2040+
habitableworldsobservatory.org

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www.liverpool.ac.uk/~sdb/Talks



Dr Steve Barrett
DU3A 4 Apr 2025