Exoplanets
The Astronomy Revolution

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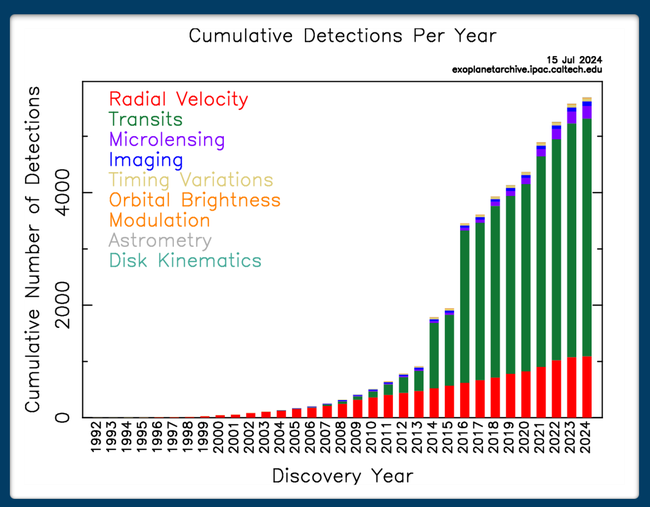
Planets outside the solar system

• 1995: discovery of 51 Pegasi b, the first confirmed planet orbiting a Sun-like star, by Mayor and Queloz (Nobel Prize in Physics, 2019)

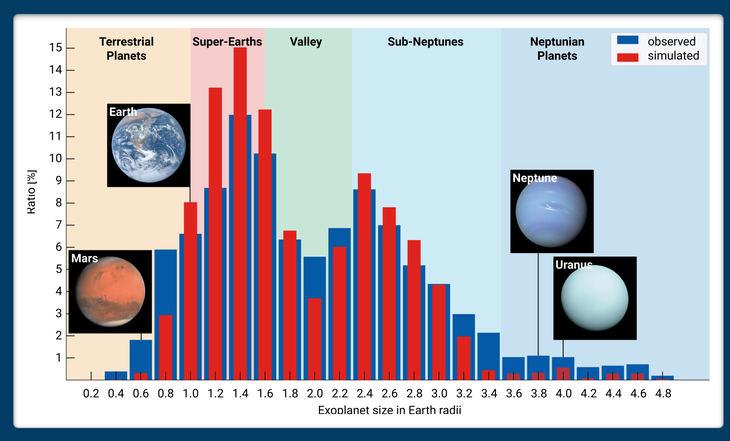
• 2024: +5600 confirmed exoplanets, exponential growth due to detection methods: radial velocity, transits…



A huge diversity of worlds

• Wide variety of exoplanets: hot Jupiters, super-Earths, lava planets…

• Most are bigger than Earth and smaller than Neptune: no similar planets in our solar system!



R. Burn, C. Mordasini / MPIA

Ocean planets?

• Hypothesis: planets made of H_2O (~50%), great candidates to host life!

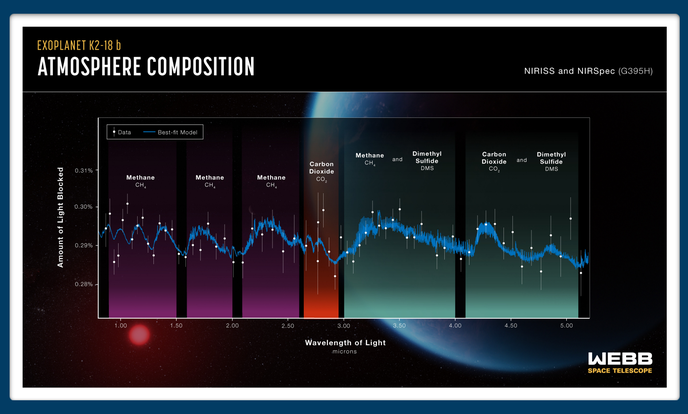
• Degeneracies: density measurements are not enough to confirm them, other kind of information is needed

Astrobiology: the search for life

• Atmospheric characterization of exoplanets: hazes, winds, chemical compositions, temperature…

• Biomarkers: gases produced by extraterrestrial life

• Candidate: DMS (dimethyl sulfide), produced by marine plankton on Earth. Potential signs of it detected in the atmosphere of K2-18 b, a possible water world



N. Madhusudhan et al. (2023)

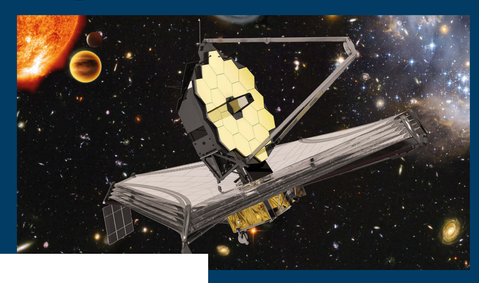
A promising future

• Goals: discover more exoplanets, study their physical properties, solve open questions and degeneracies, learn about planetary formation, characterize their atmospheres and possibly find life!

But, how? Actual + future developments on technology, ground and space-based telescopes and missions

Extremely Large Telescope, Chile

LIFE
LARGE INTERFEROMETER FOR EXOPLANETS



James Webb Space Telescope

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