

# **Week 2: Exoplanet Detection Techniques**

# Recap: Week 1

Space is LARGE:

- our fastest space ship took 10 years to reach Pluto
- light from the sun takes over 5 hours to reach Pluto!
- it would take our fastest space ship almost 75,000 years to reach the closest star to the sun!

Atmospheres are important:

- help regulate planet temperature
- protect us from space debris
- protect us from radiation

Habitable planet qualities:

- atmosphere
- geologic activity
- magnetic field
- solid surface
- organic molecules
- energy source

# **Direct Imaging Is Hard!**

**Stars are BRIGHT**

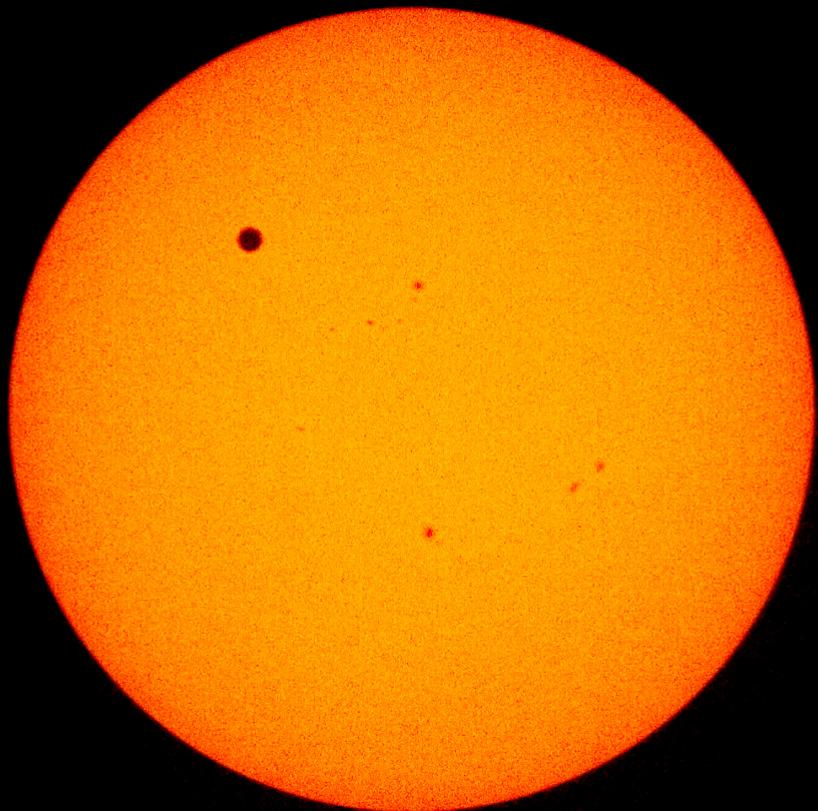
**Planets are SMALL**

**Everything is FAR**

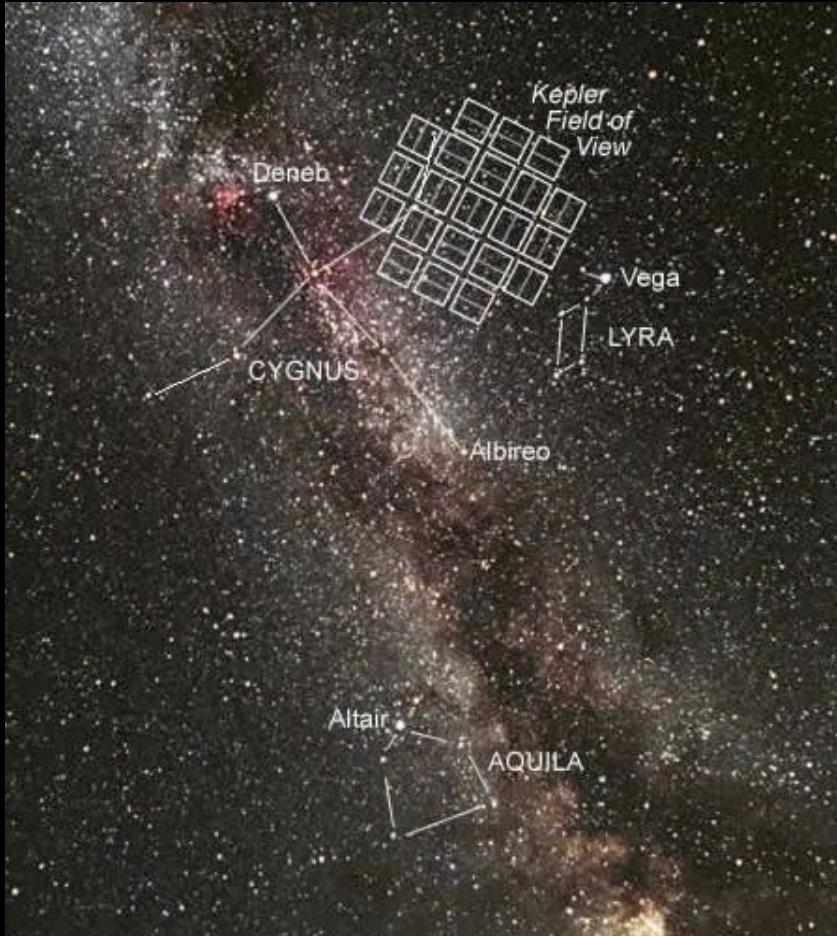
# Spot the Planet



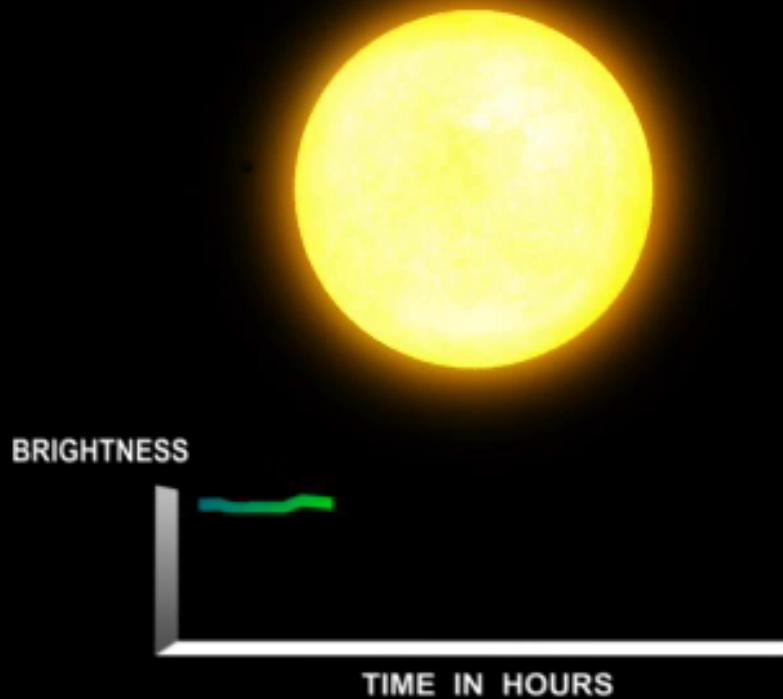
# Spot the Planet: Round 2



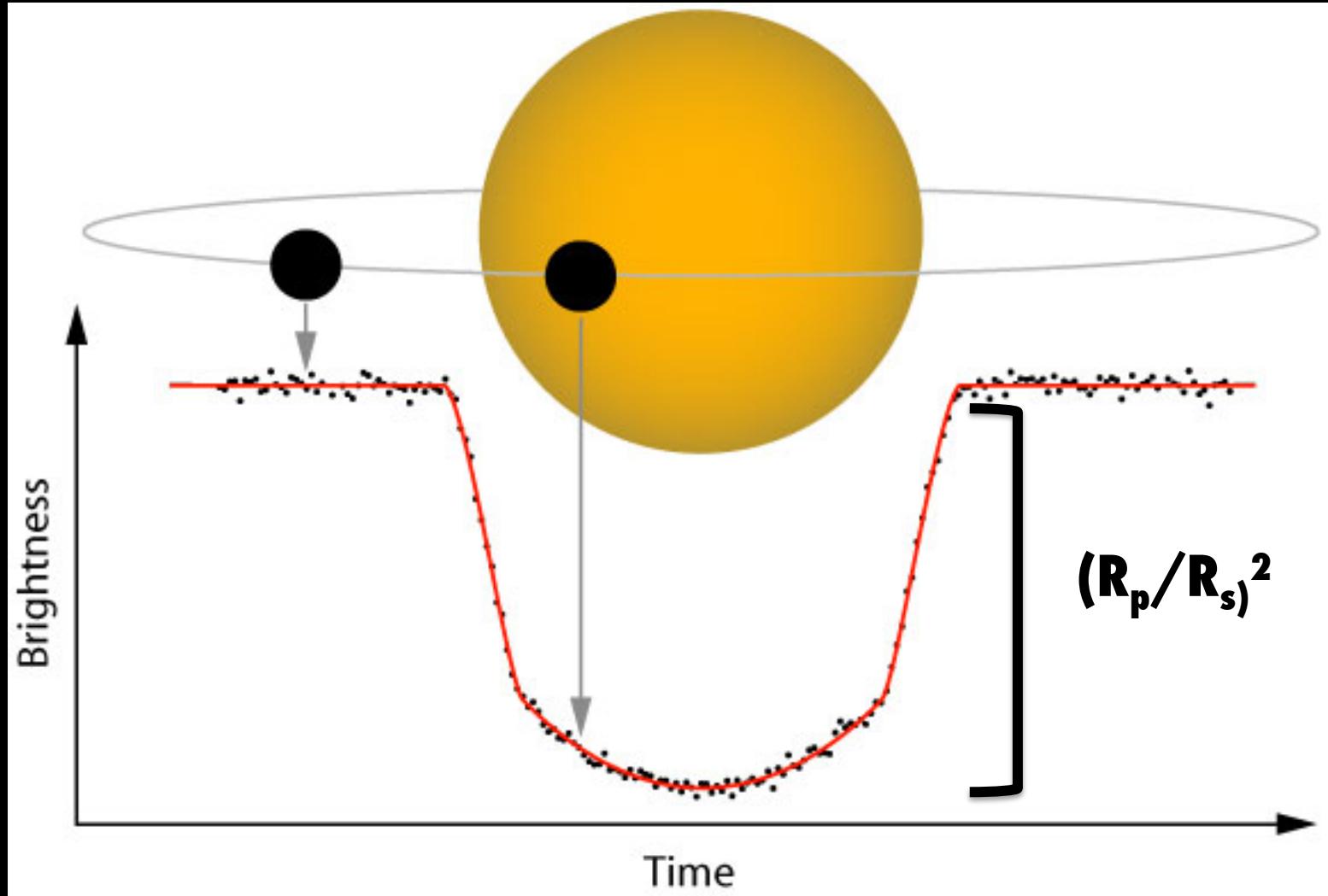
# Kepler Mission



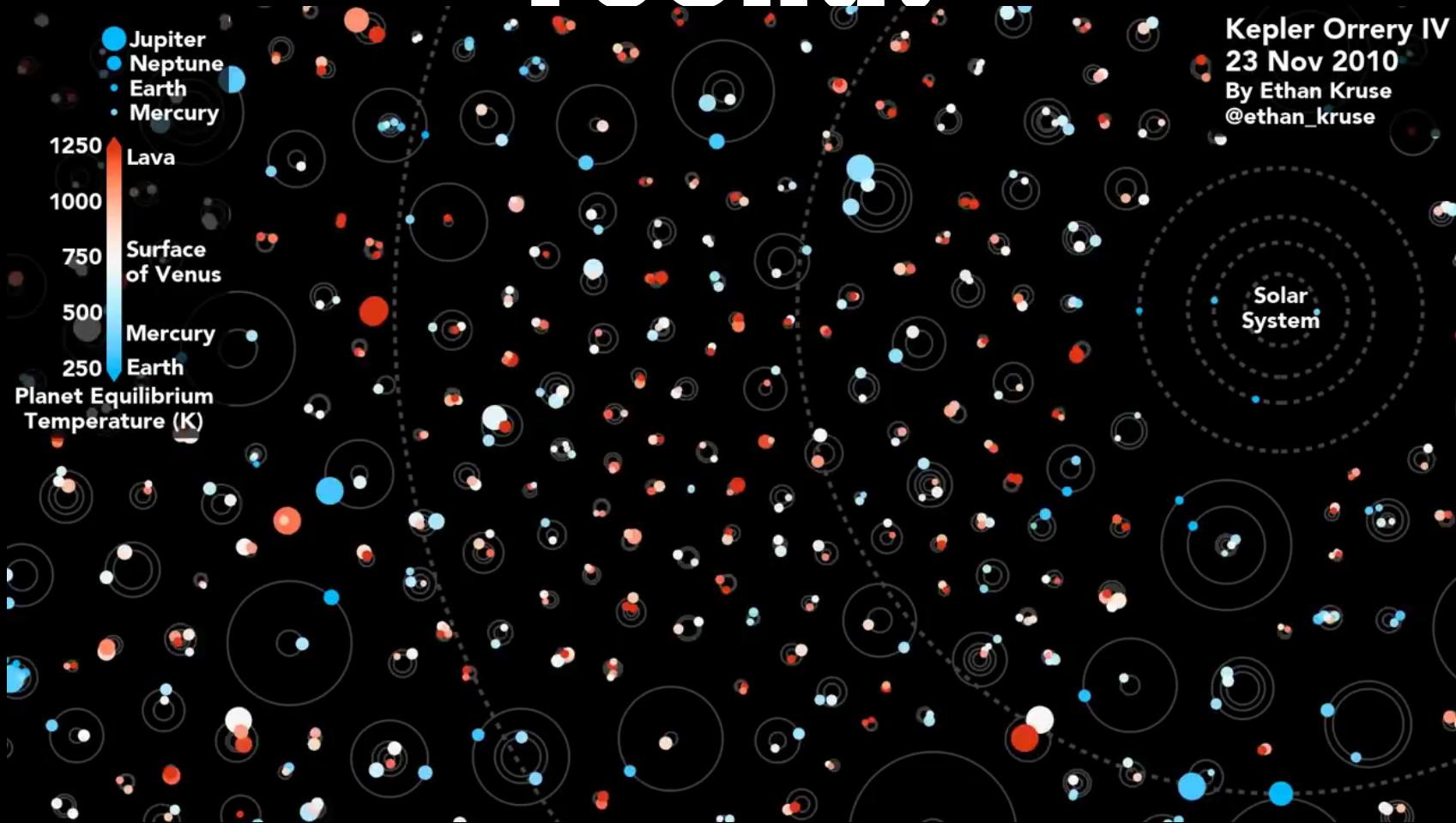
# Transit Method



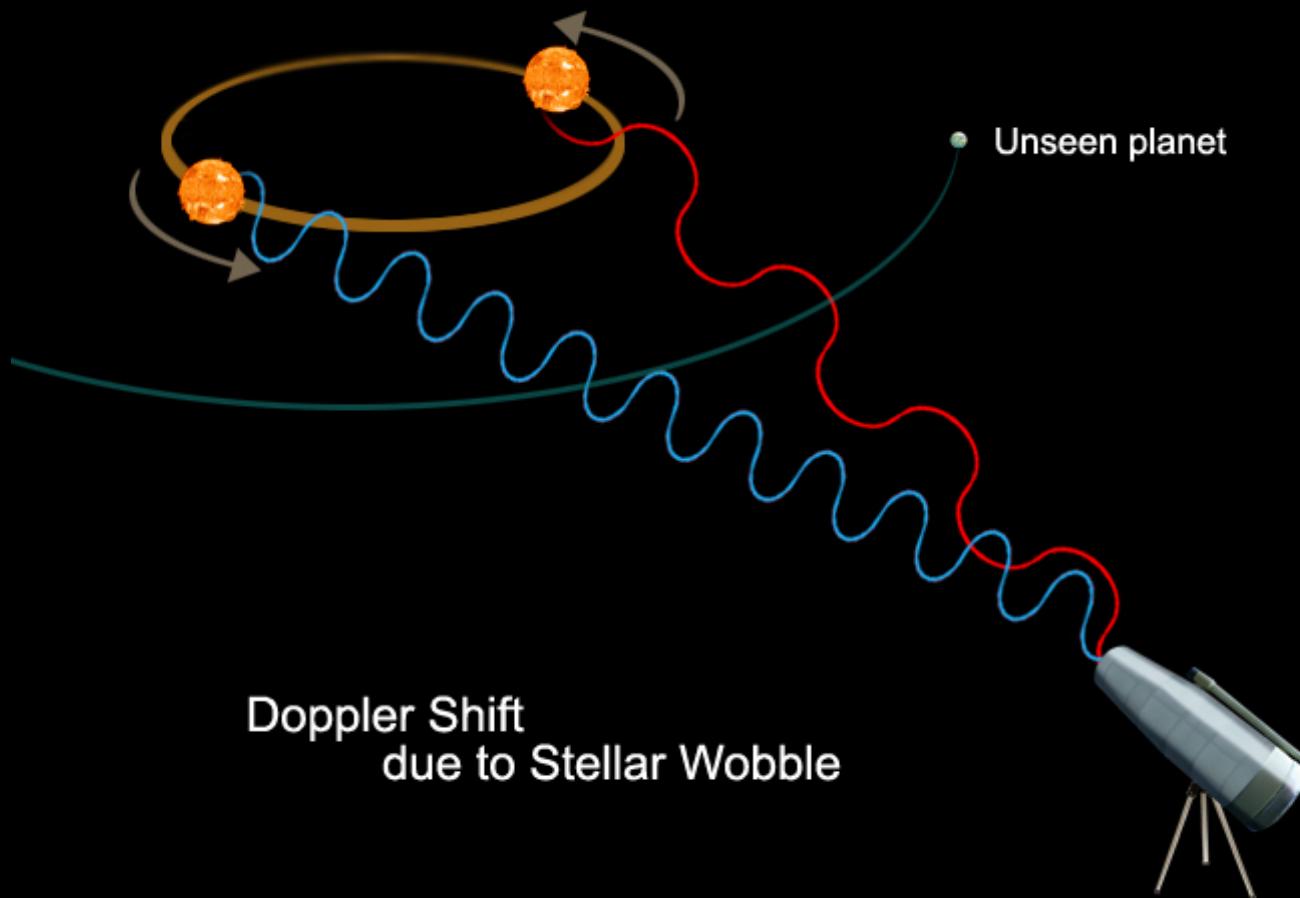
# Light Curve: What Does it Mean?



# Kepler: What We've Found!



# Radial Velocity Method



# Recap

## Radial Velocity Method

- + measures planet **MASS**
- orientation must be “edge-on”
- biased towards massive, close-in planets

## Transit Method

- + measures planet **RADIUS + DISTANCE FROM STAR**
- orientation must be “edge-on”
- biased toward short orbital periods
- can get false detections

**MASS + RADIUS → DENSITY**