

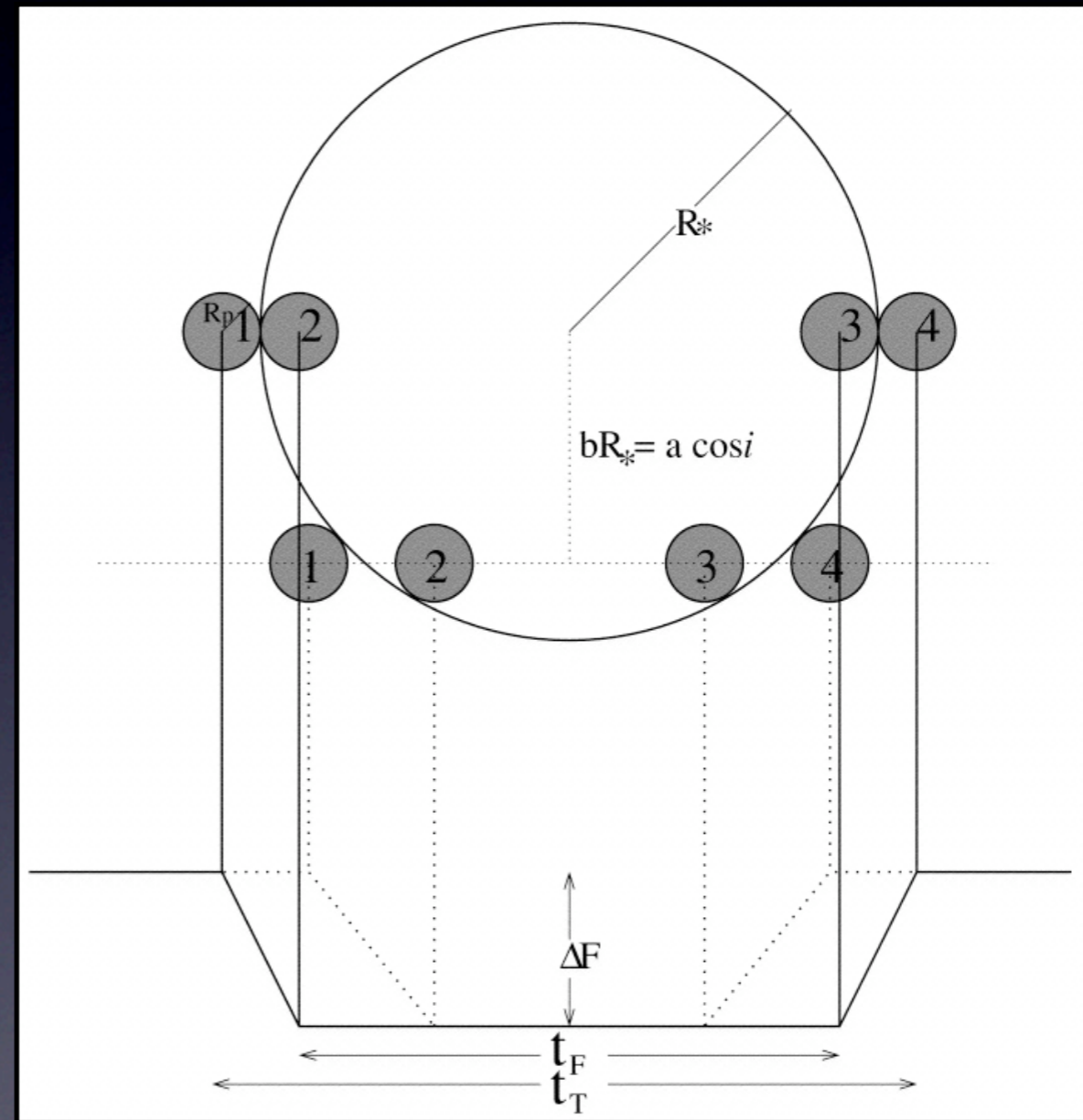
# The discovery of transiting planets with the SuperWASP survey



**Elaine Simpson**, *Queen's University Belfast*  
*on behalf of the SuperWASP Consortium, SOPHIE & CORALIE planet-search teams*

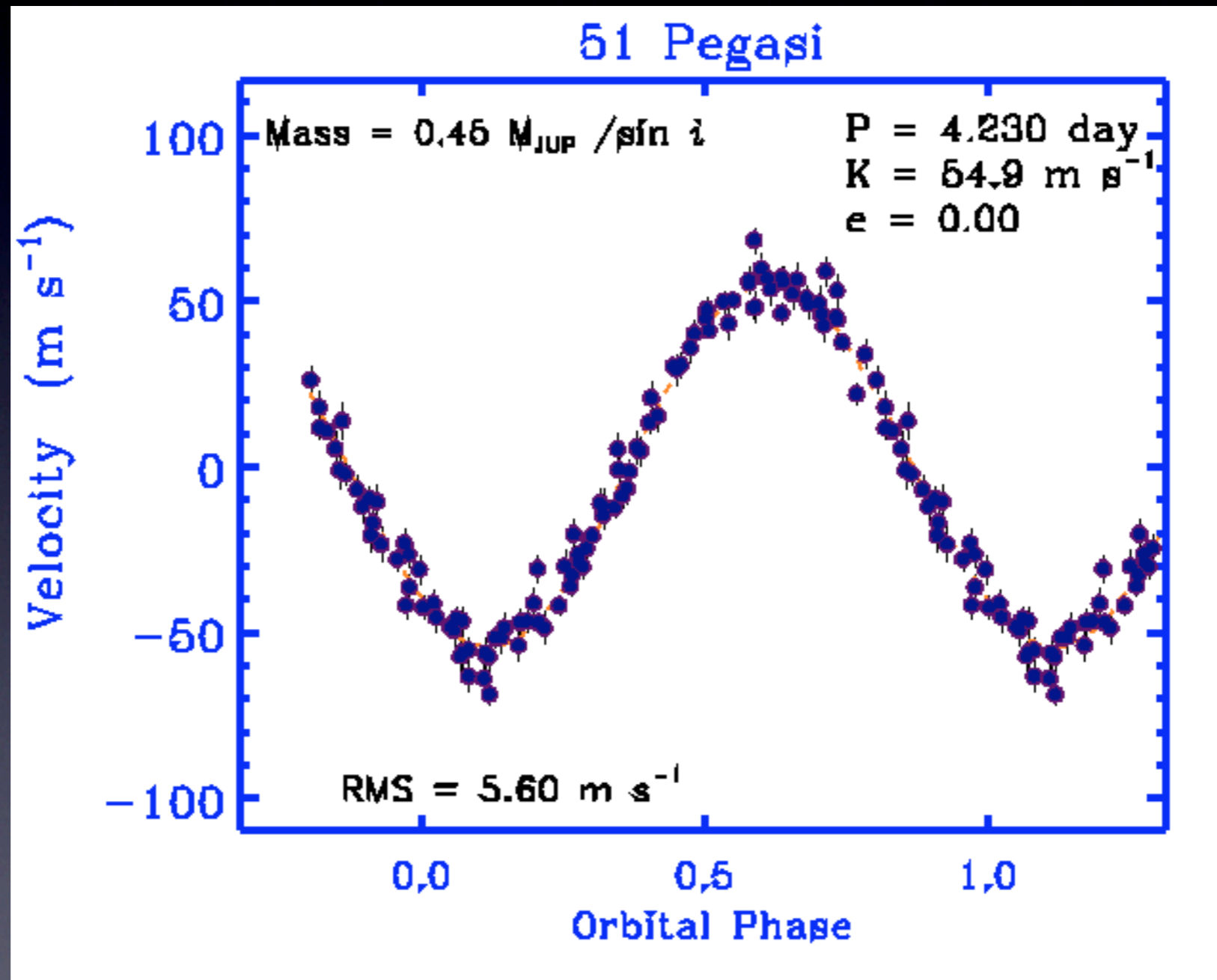
# Extrasolar planets

- Hot Jupiters
- Dedicated surveys
  - TrES
  - HAT
  - CoRoT
  - XO
  - SuperWASP
- > 15% transiting

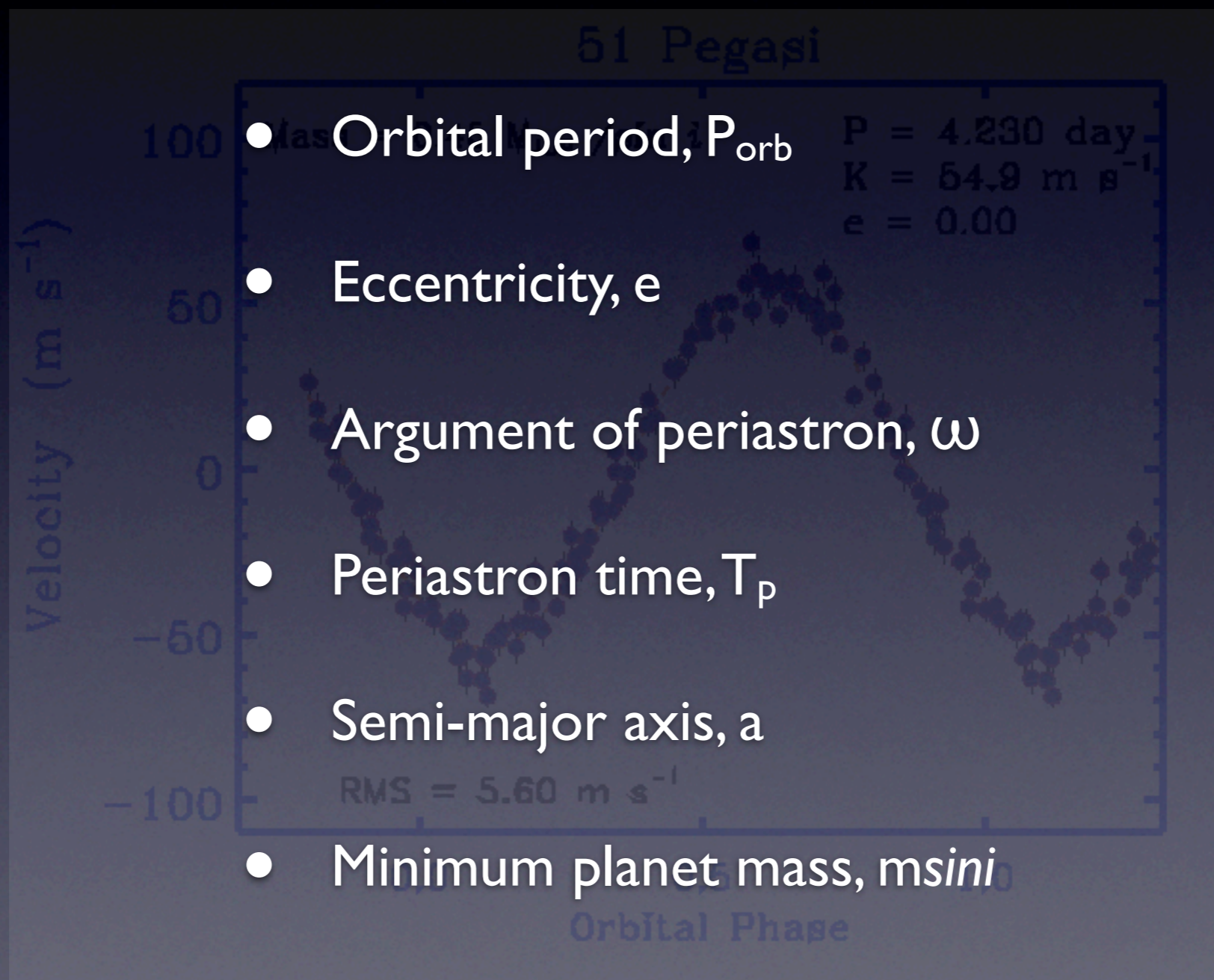


(Seager S., Whitney B. A., Sasselov D. D., 2000, ApJ, 540, 504)

# Importance of transits



# Importance of transits



# Importance of transits

- Orbital period,  $P_{\text{orb}}$

- Eccentricity,  $e$

- Argument of periastron,  $\omega$

- Periastron time,  $T_p$

- Semi-major axis,  $a$

- ~~Minimum planet mass,  $m \sin i$~~

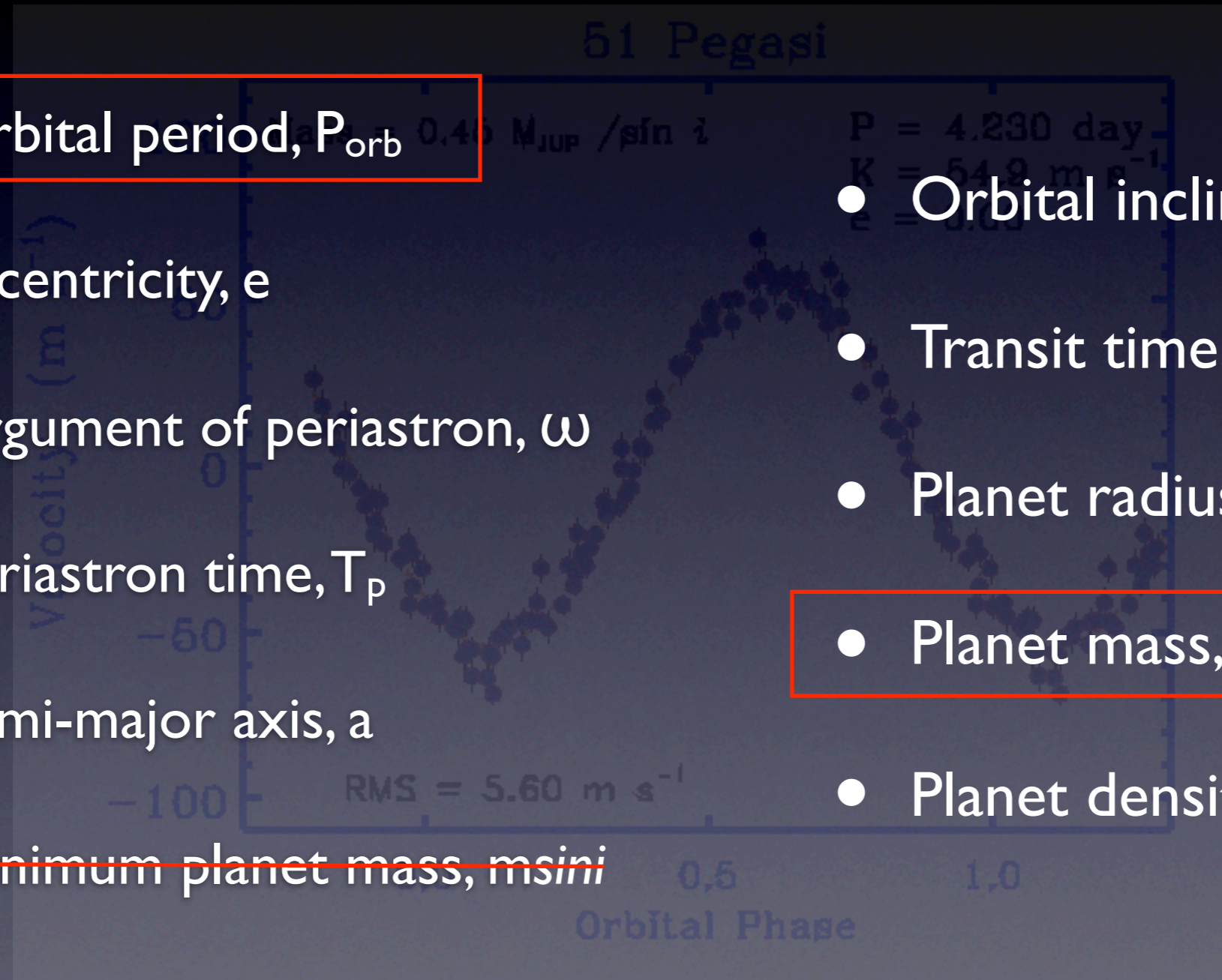
- Orbital inclination,  $i$

- Transit time,  $T_t$

- Planet radius,  $r_p$

- Planet mass,  $m_p$

- Planet density,  $\rho_p$



# WASP - Wide Angle Search for Planets

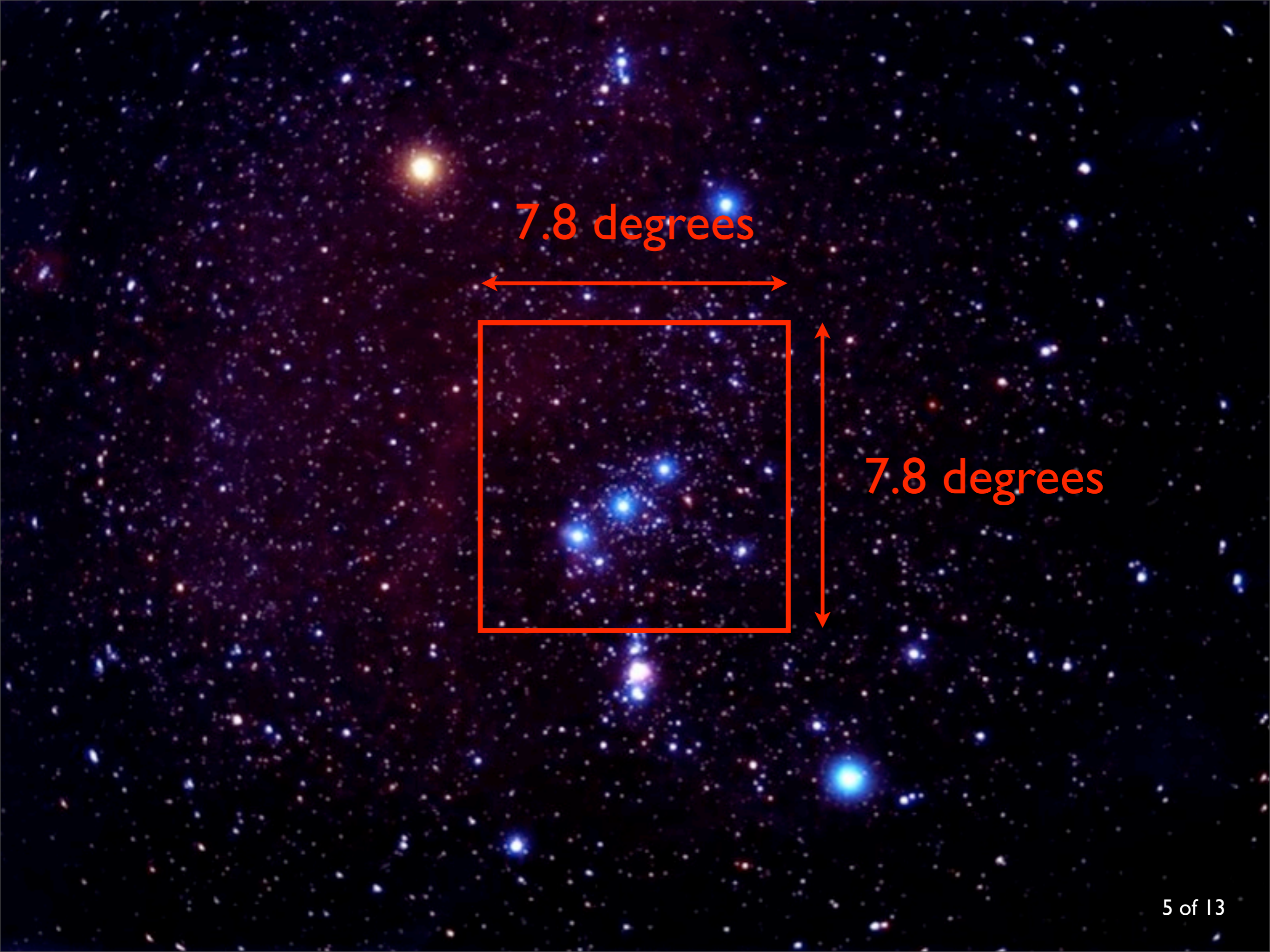


NASA, [www.visibleearth.nasa.gov](http://www.visibleearth.nasa.gov)

# WASP - Wide Angle Search for Planets



- 11cm Canon lenses
- 2k x 2k e2v CCD
- 10mmag @ V=12

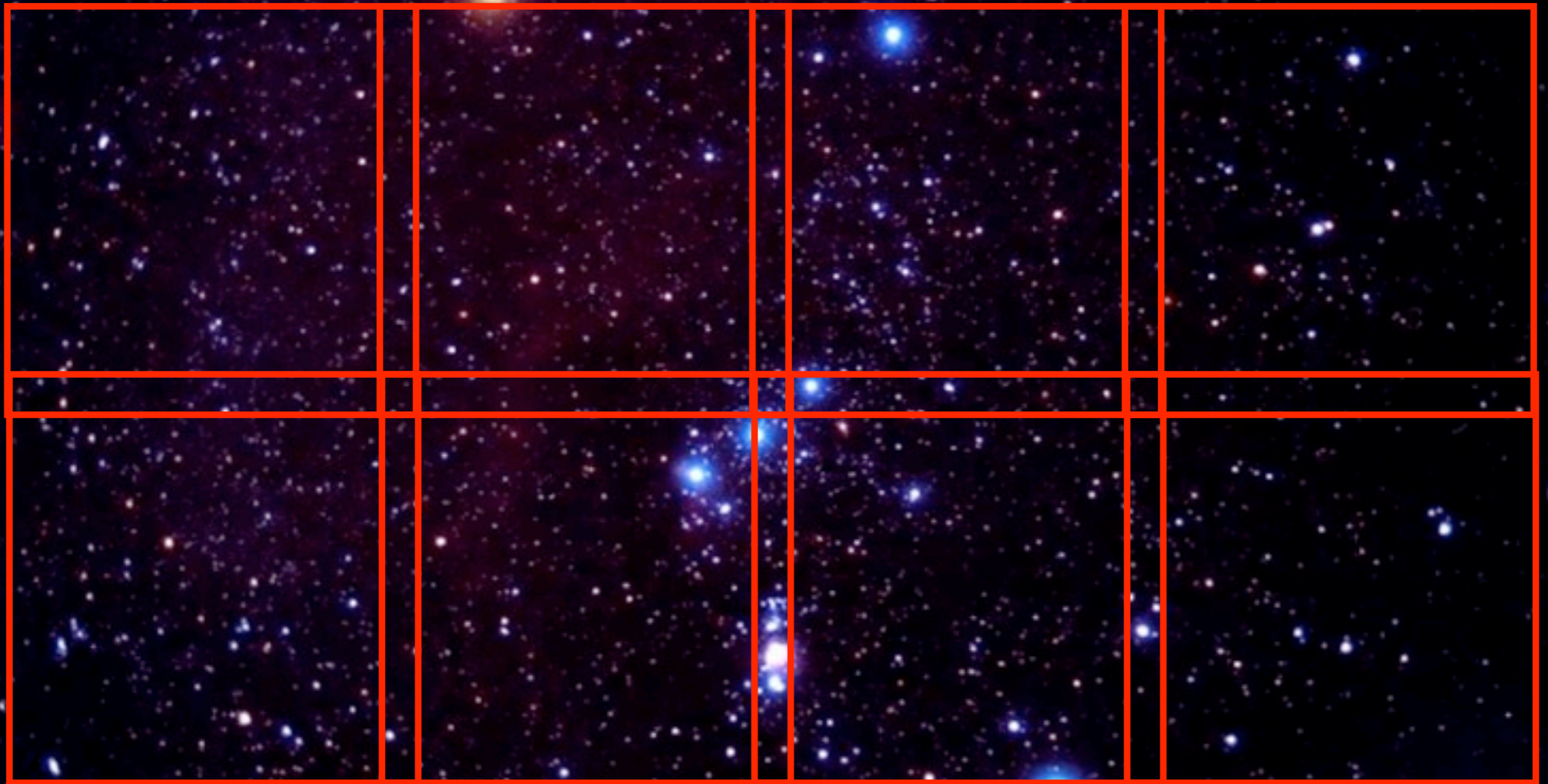


7.8 degrees

7.8 degrees

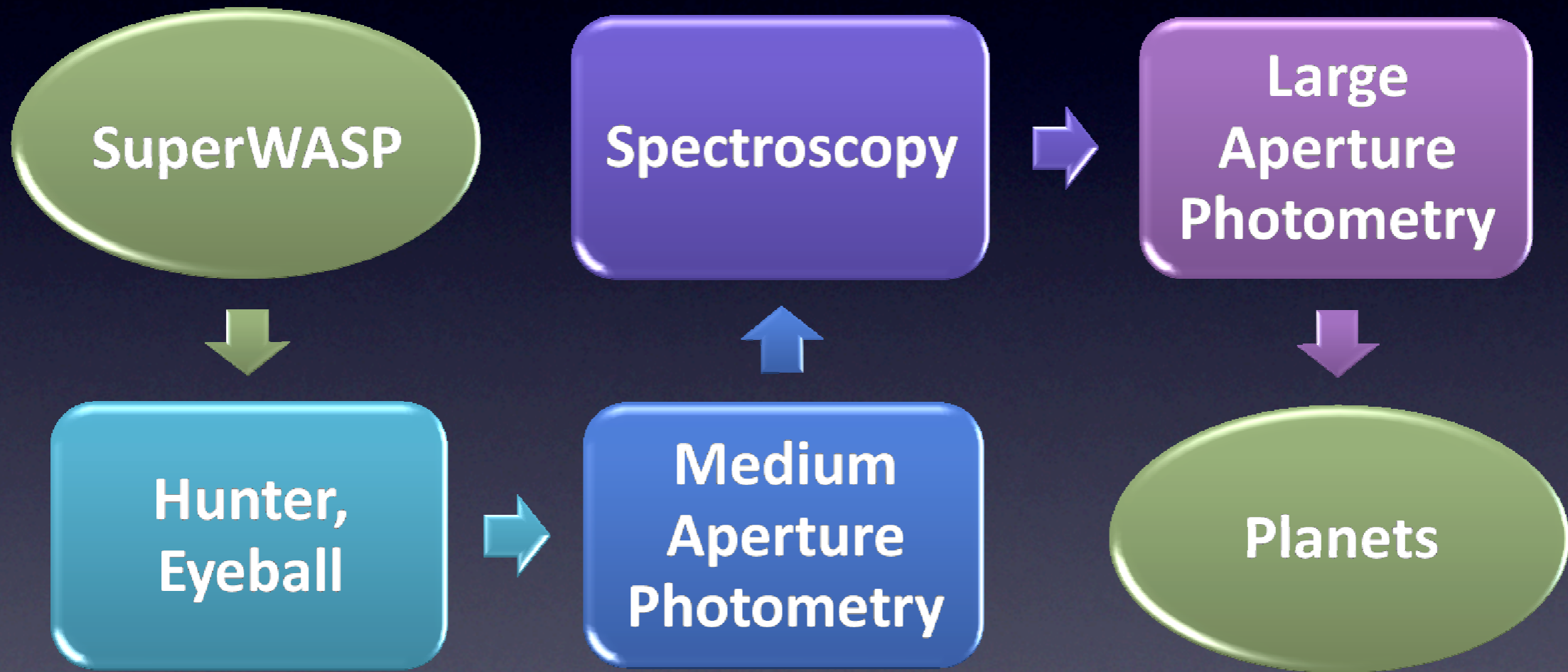


2 x 30s exposures  
5-10 min cadence



100 GB / night  
1 million stars

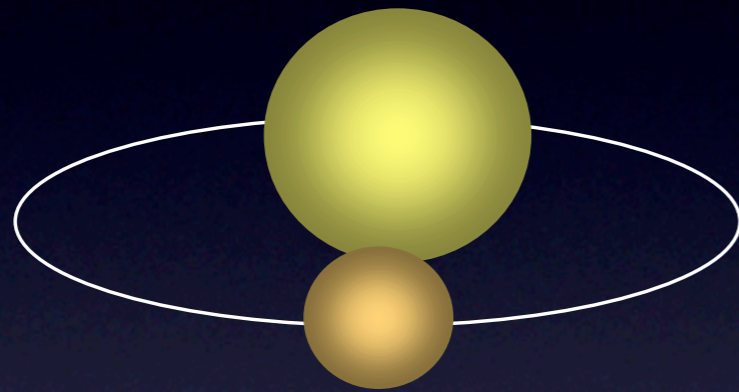
# Discovery Flow



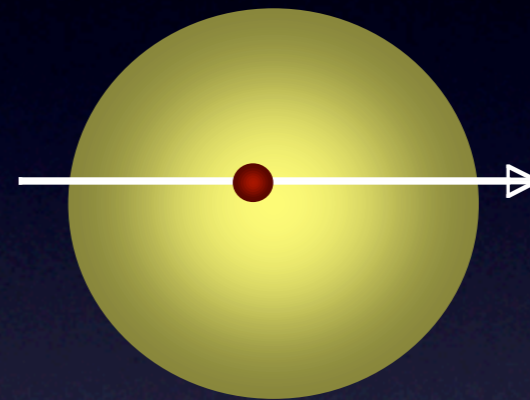


# Astronomical False-Positives

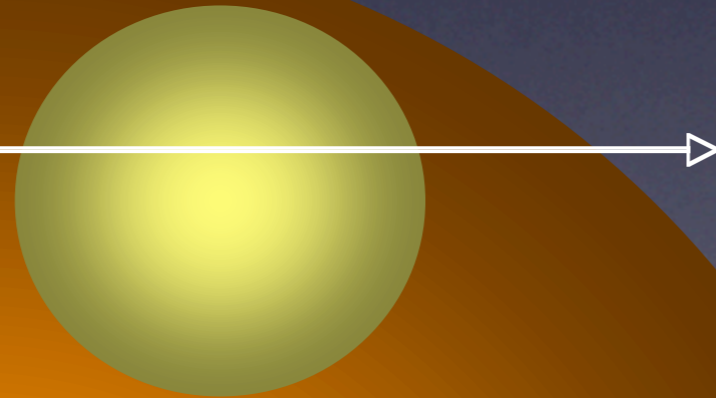
## 1) Eclipsing Binary



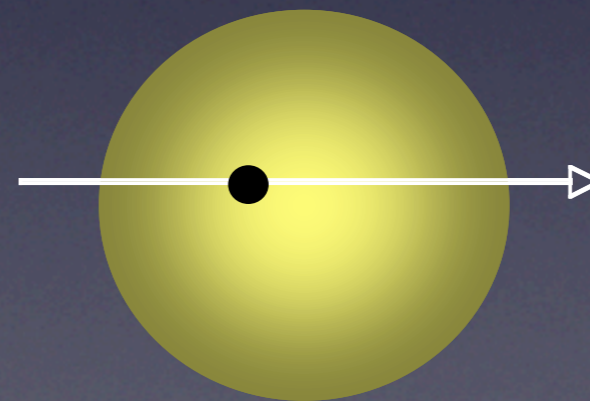
Grazing stellar binaries



Red/brown dwarfs

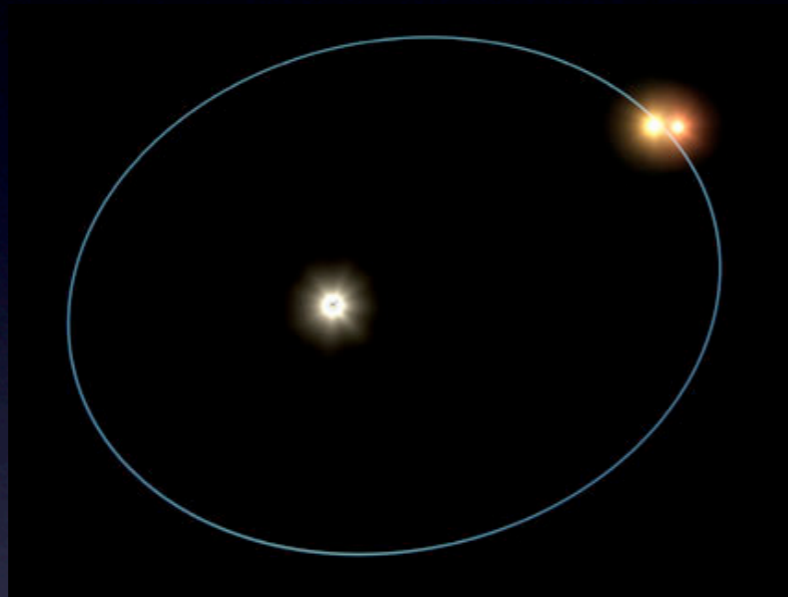


Giant/Main Sequence binary

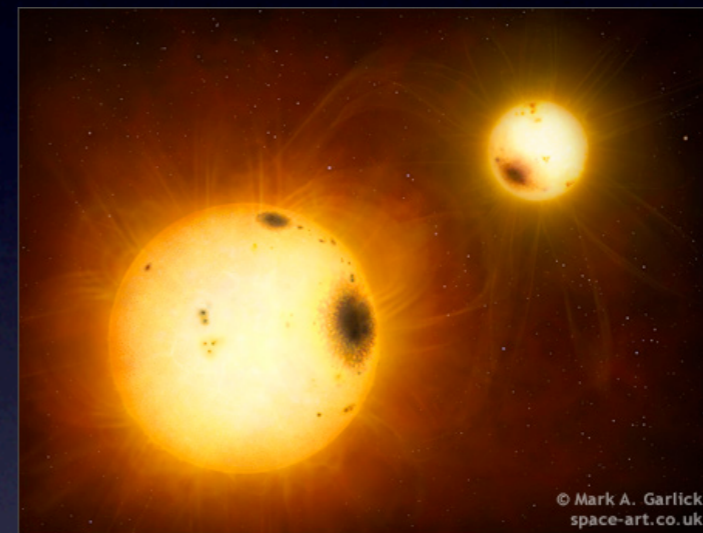


Planets

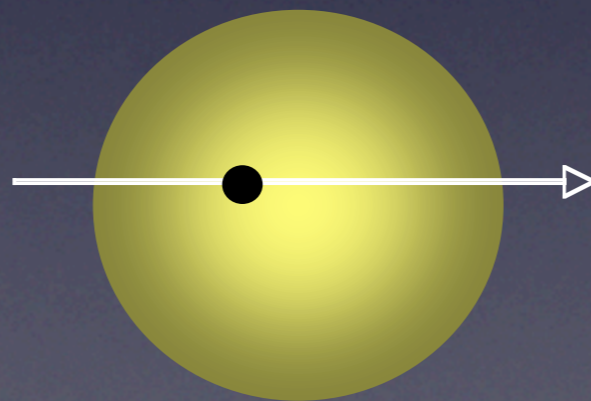
# Astronomical False-Positives



2) Blend



3) Stellar Activity



Planets

# Summary

**Period: 1 - 8 days**

**Mass: 0.5  $M_J$  - 8  $M_J$**

**Radius: 0.9  $R_J$  - 1.8  $R_J$**

**Eccentricity: 0 - 0.1**

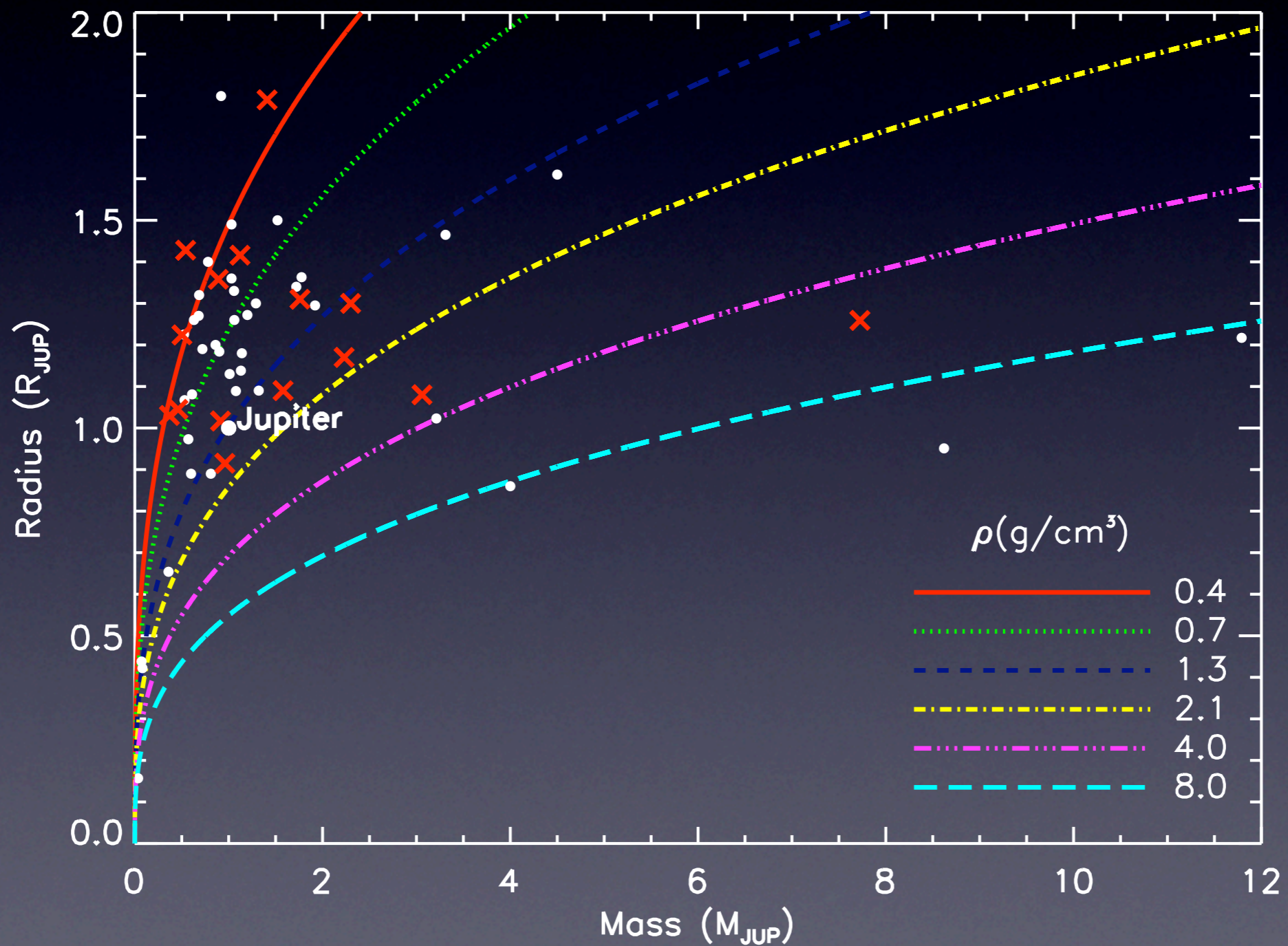
**Temperature: 1100 - 2500 K**

**Spectral Type: F5V - K5V**

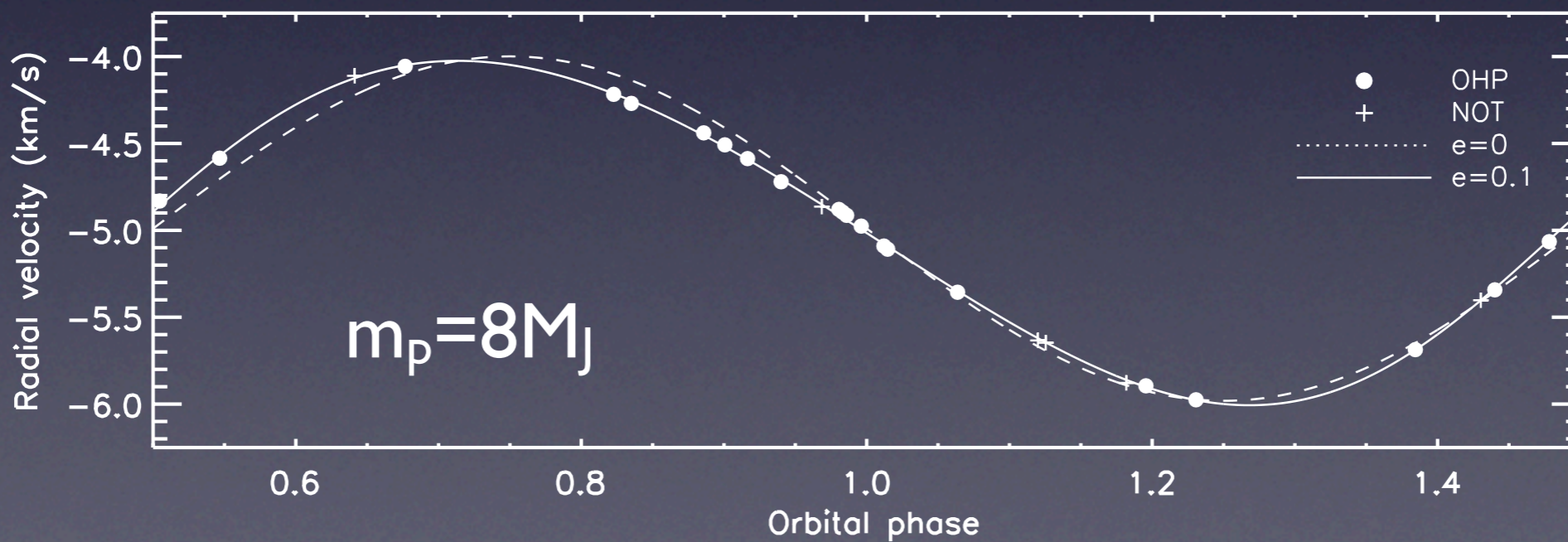
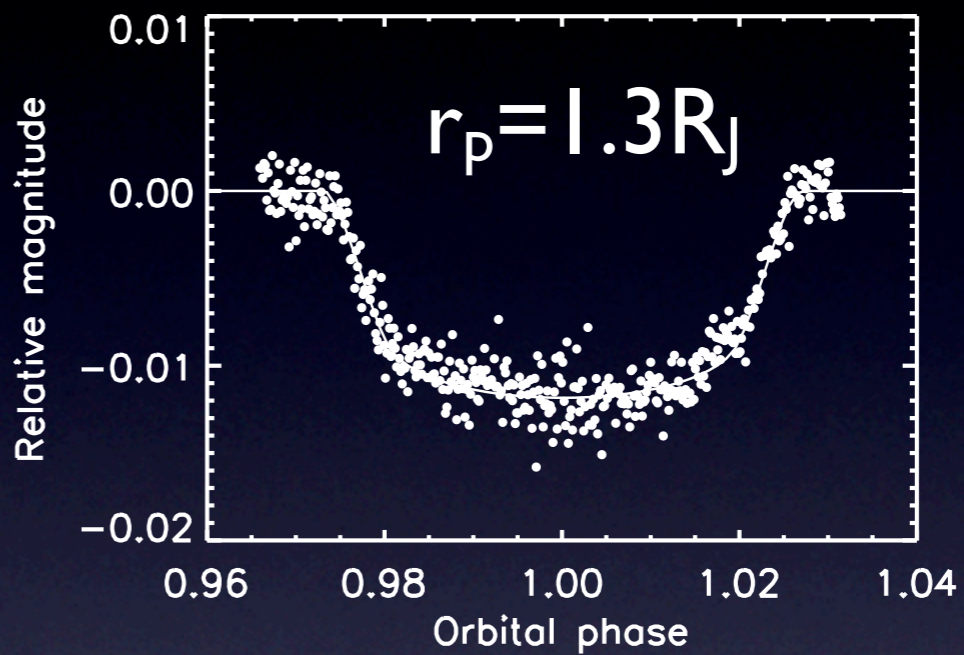
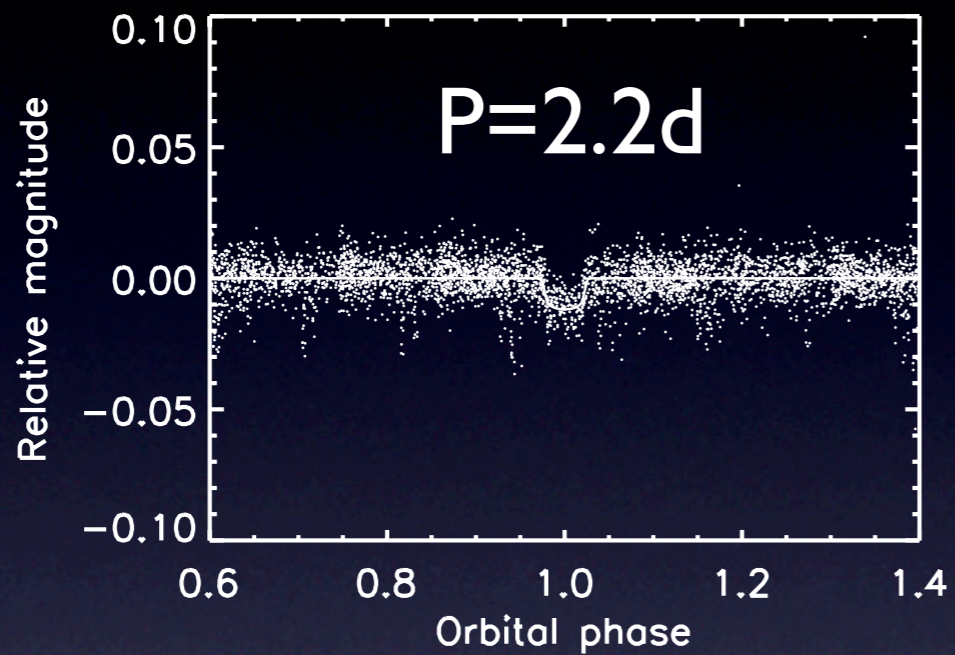
**V-Mag: 9.5 - 12.7**

**15  
planets**

# Mass-Radius diagram

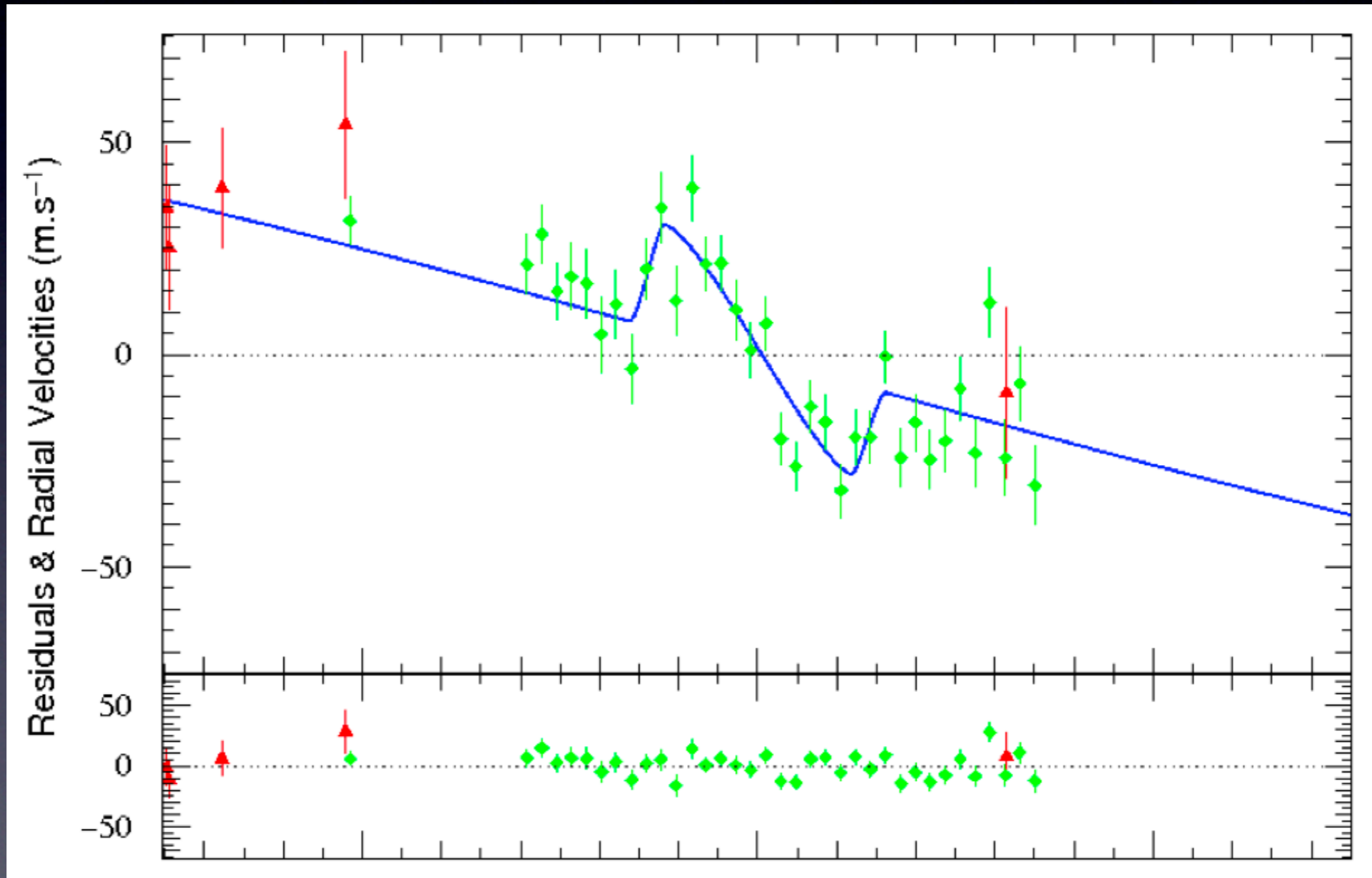
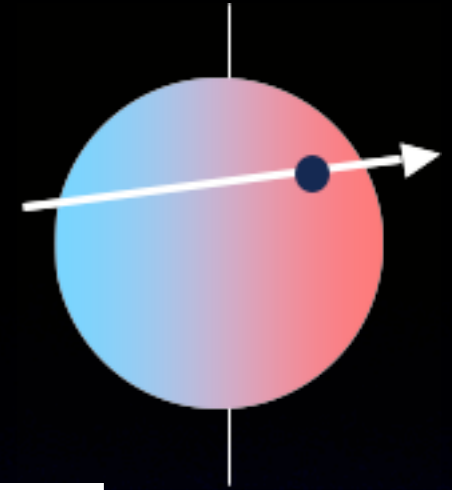


# WASP-14b





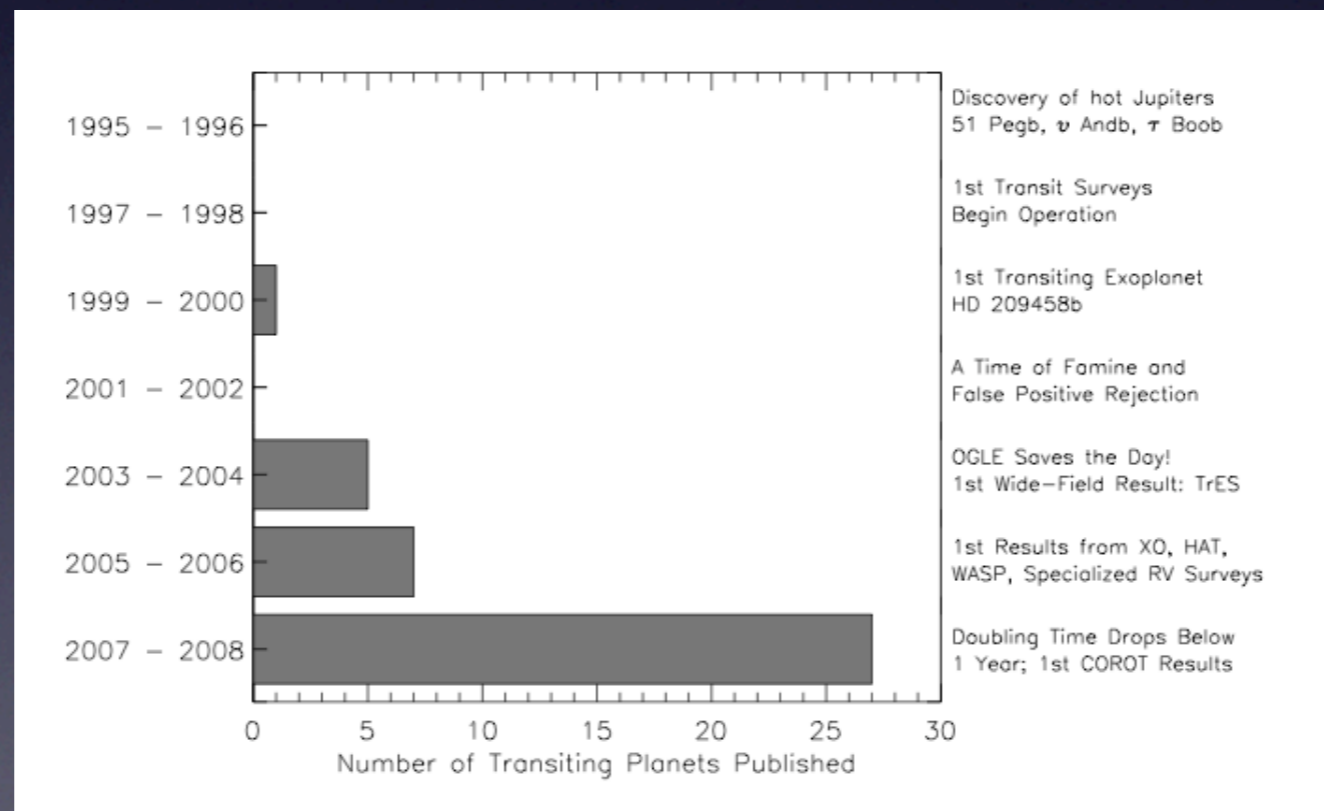
# Follow-up



(Guillon M., et al. eprint arXiv:0901.4705)

# Future prospects

- New fields
- Reducing systematics
- Characterisation



(Charbonneau, D. 2008, ArXiv e-prints, 808, arXiv:0808.3007)

*--- End ---*

