Exoplanets – Worlds Around Other Stars

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• There are currently over 300 candidate extrasolar planets known today.
• Right shows a small sample of these.
  1. Note that the Earth is at 1 AU from the Sun.
  2. Mercury is at about 0.3 AU.
  3. Many of these exoplanets are in very small orbits.
  4. Some are multi-planet systems.
Example of Three Imaged Planets
Another Example of an Imaged Planet

GQ Lupi

ESO VLT NACO June 2004

A

b

Neuhäuser, Guenther, Wuchterl, Mugrauer, Bedalov, Hauschildt
Finding Planets from Star Motion

- **HD 11964**, trend removed
  - $M \sin i = 0.6 \ M_J$
  - RMS = 5.37 m/s
  - $\chi^2 = 0.87$

- **HD 66428**
  - $M \sin i = 2.96 \ M_J$
  - RMS = 2.90 m/s
  - $\chi^2 = 0.46$

- **HD 99109**
  - $M \sin i = 0.52 \ M_J$
  - RMS = 6.28 m/s
  - $\chi^2 = 0.87$

- **HD 164922**
  - $M \sin i = 0.36 \ M_J$
  - RMS = 3.72 m/s
  - $\chi^2 = 0.60$
Hubble measures minute variation in star's motion due to gravitational pull from companion planet Gl 876b.

Star Gl 876 without planet: Moves in straight line

Star Gl 876 (visible) with planet (invisible): "Wobble" detected

0.5 milliarcsec

Period = 61 days
Kepler Results

Kepler Candidates as of February 1, 2011

Size Relative to Earth

Orbital Period in days
The Habitable Zone
The End of Planetary Systems