Suggested Discussion Questions for Planetary PostCards

That star is hotter/colder than our Sun. How do you think that might affect its planets?

Here is where one of the planets orbits that star. What would it be like to live on this planet (or one of its moons)?

If Earth was orbiting that star, what might be different?

How big do you suppose this planet is compared to the planets in our Solar System?

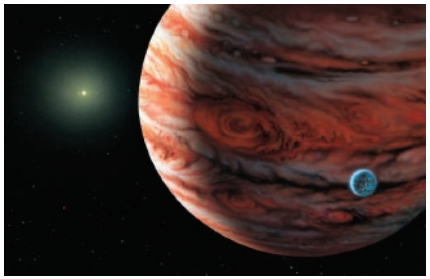
Do you think we have found all the planets in this system?

Our fastest spacecraft travels 42 miles per second. It would take 5,000 years for that spacecraft to go one light year. How long would it take to reach this star which is ____ light years away?

How different do you think Earth will be in that period of time?

PlanetQuest the search for another Earth

Planetary PostCards



Artist: Lynette Cook 55 Cancri System

Abbreviations and terms used on PostCards

RA = Right Ascension

Dec = Declination

mag = apparent visual magnitude

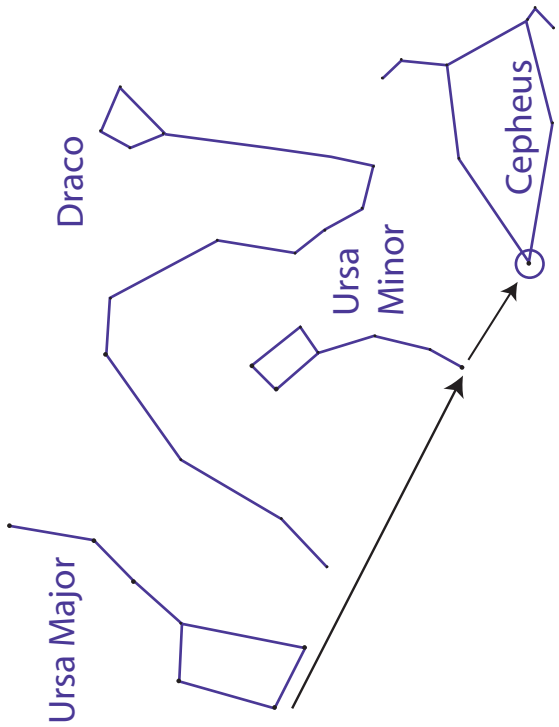
AU = Astronomical Unit, the distance between the Earth and the Sun: 93 million miles or 150 million km

Light year = The distance light travels in a year. Light travels at 186,000 miles per second or 300,000 km per second. Light from the Sun takes 8 minutes to reach Earth.

Jupiter mass = 1.9×10^{27} kg. Jupiter is about 300 times more massive than Earth (approximate difference between a large bowling ball and a small marble)

Temperature of the stars is in degrees Celsius

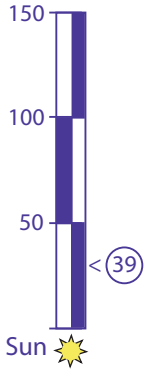
gamma Cephei



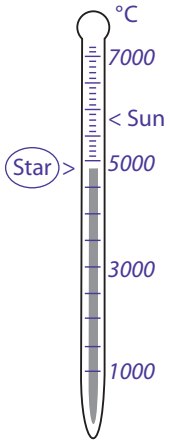
RA: 23h 39m
Dec: 77° 39'
mag: 3.2

Star: Gamma Cephei

How far in light years?



How Hot?

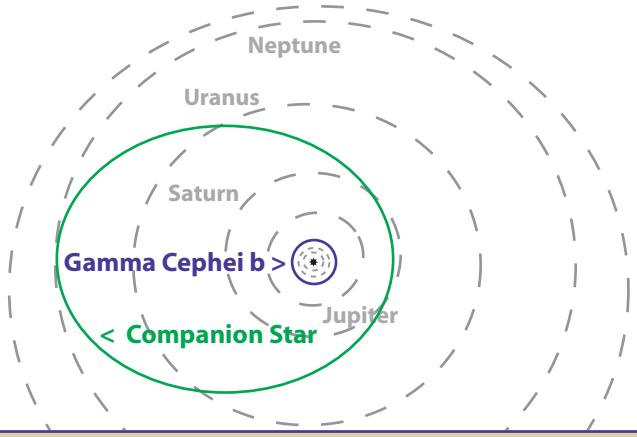


The brightest star with a planet is a Binary star AND it's a Red Giant!

Its small "companion star" gets as close as 12 AU in a 40-year orbit.

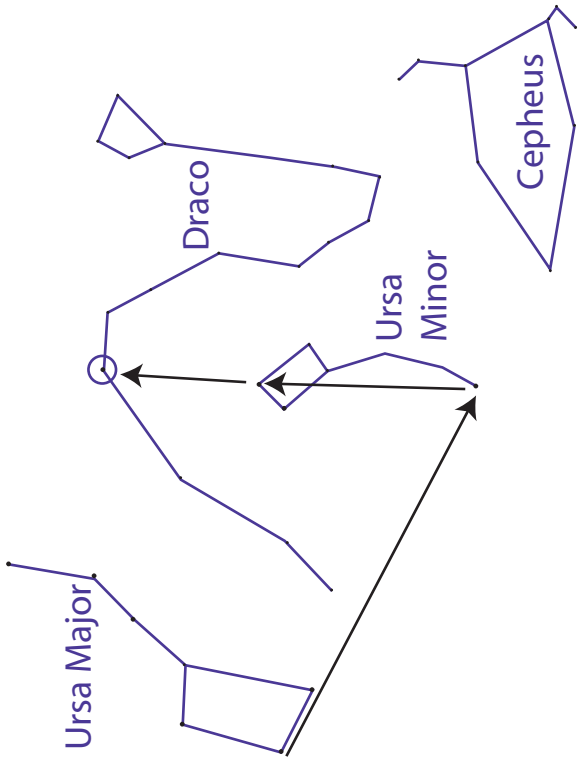
Planet: Gamma Cephei b

Star's System Compared to Our Solar System



Planet (year discovered):	b (2002)
Avg Distance From Star: (Earth from Sun = 1 AU)	2 AU
Orbit:	2.5 years
Mass:	1.8 Jupiters

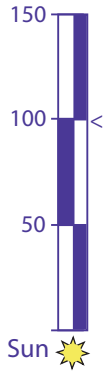
iota Draconis



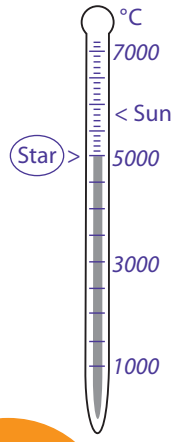
RA: 15h 24m
Dec: 58° 57'
mag: 3.3

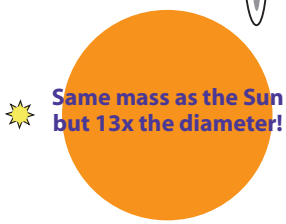
Star: Iota Draconis

How far in light years?



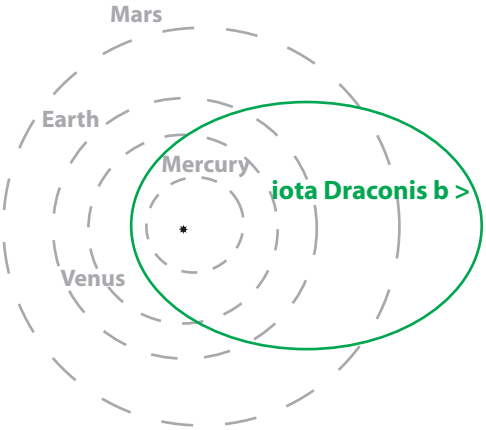
How Hot?





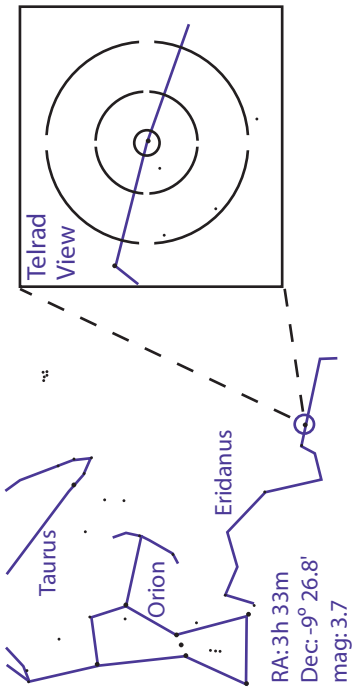
Planet: Iota Draconis b

Star's System Compared to Our Solar System

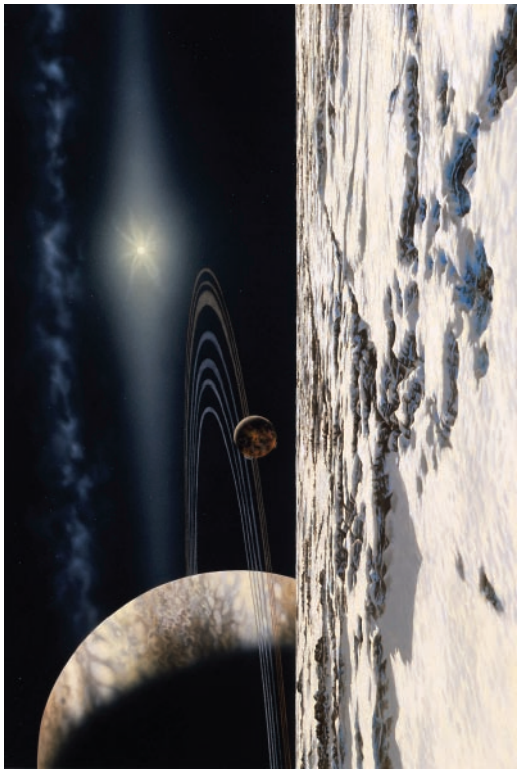


Planet (year discovered):	b (2002)
Avg Distance From Star: (Earth from Sun = 1 AU)	1.3 AU
Orbit:	1.5 years
Mass:	8.7 Jupiters(!)

Epsilon Eridani

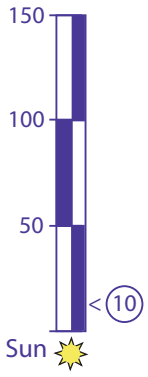


View from a frozen moon of the "b" planet, with a smaller volcanic moon closer to the planet. Also shows a possible dust ring around the star.

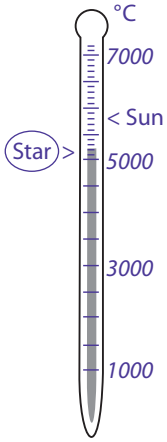


Star: Epsilon Eridani

How far in light years?



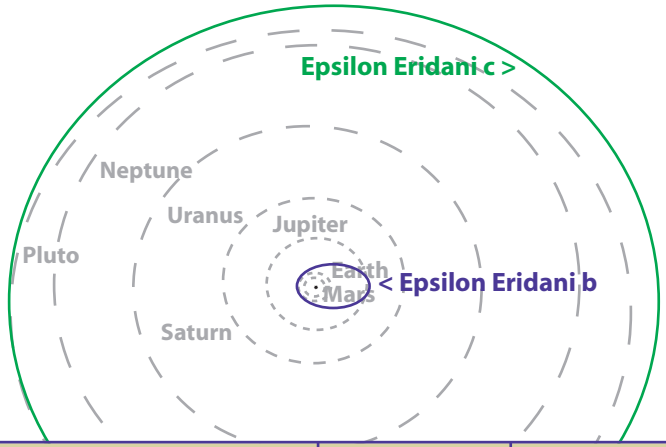
How Hot?



This is the closest star to us with known planets. Our fastest spacecraft would take 50,000 years to reach this star system.

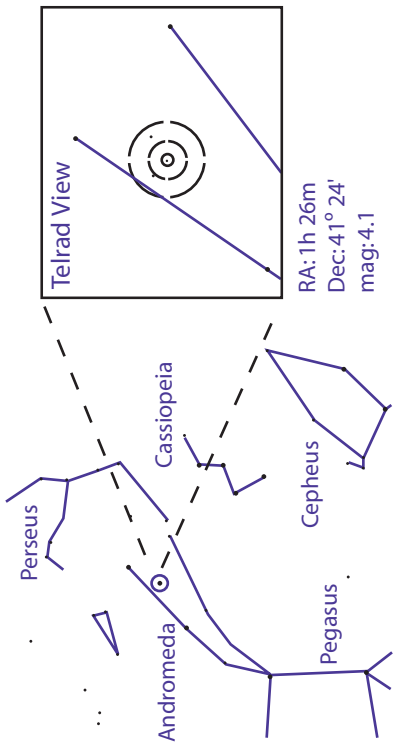
Planet: Epsilon Eridani b and c

Star's System Compared to Our Solar System

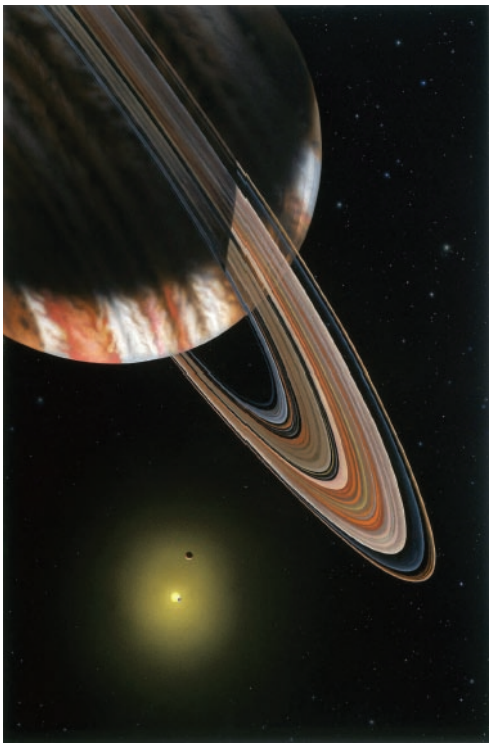


Planets (year discovered):	b (2000)	c (2002)
Avg Distance From Star: (Earth from Sun = 1 AU)	3.3 AU	40 AU
Orbit:	6.8 years	260 years
Mass:	90% of Jupiter	10% of Jupiter

Upsilon Andromedae

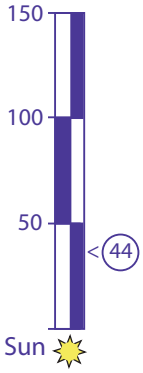


Shows all three known planets – the outer and most massive planet is shown with a ring like Saturn's.

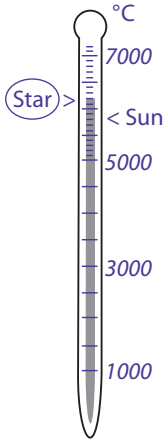


Star: Upsilon Andromedae

How far in light years?



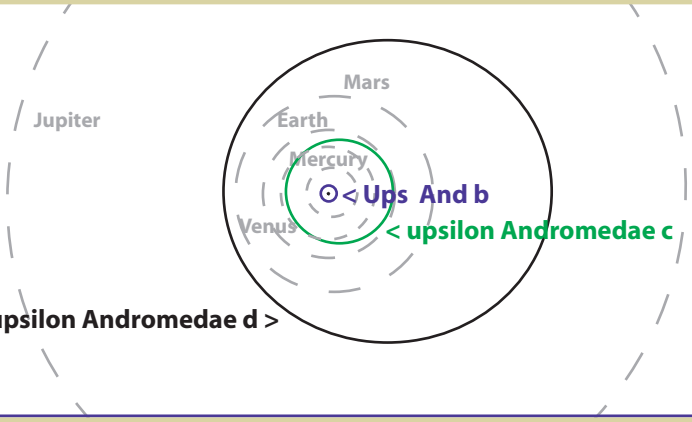
How Hot?



This is the first star discovered with a confirmed multi-planet system. Planet b was discovered in 1996 and c & d in 1999.

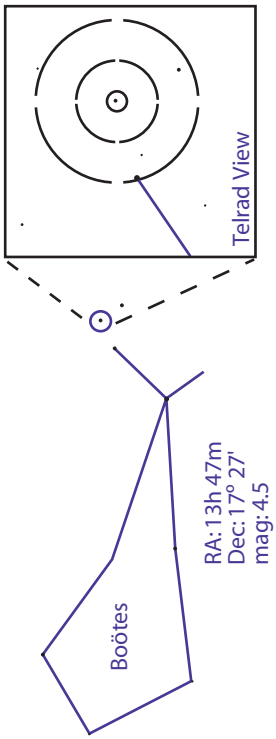
Planet: Upsilon Andromedae b, c, and d

Star's System Compared to Our Solar System



Planets (year discovered):	b (1996)	c (1999)	d (1999)
Avg Distance From Star: (Earth from Sun = 1 AU)	0.06 AU	0.83 AU	2.5 AU
Orbit:	4.6 Days	8 Months	3.5 Years
Mass:	71% Jupiter	2.1 Jupiters	4.6 Jupiters

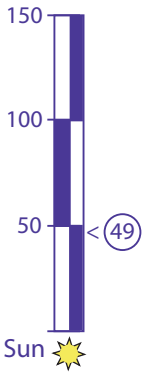
Tau Bootis



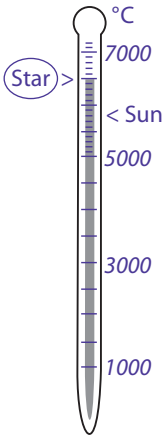
View of the Jupiter-like planet with its star in the background.

Star: Tau Bootis

How far in light years?



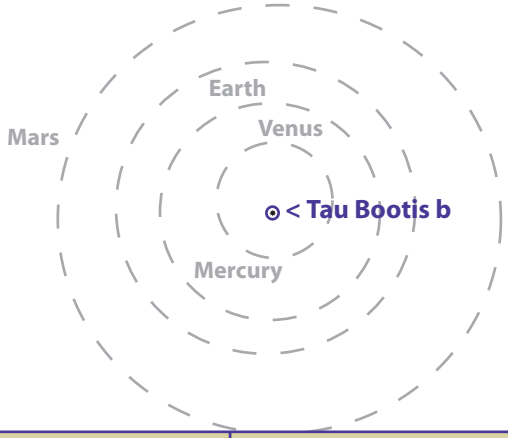
How Hot?



This huge planet is orbiting so close to its star and its star is so hot, this may be the hottest planet yet discovered!

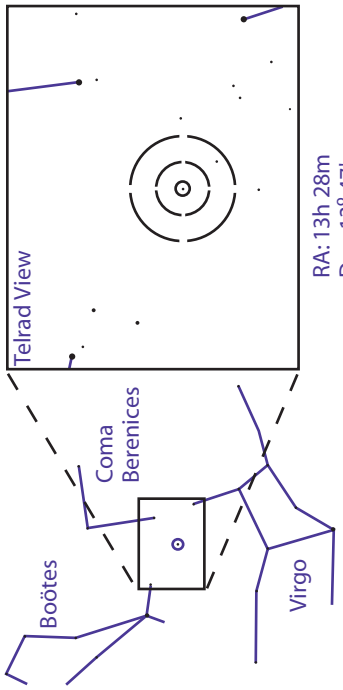
Planet: Tau Bootis b

Star's System Compared to Our Solar System



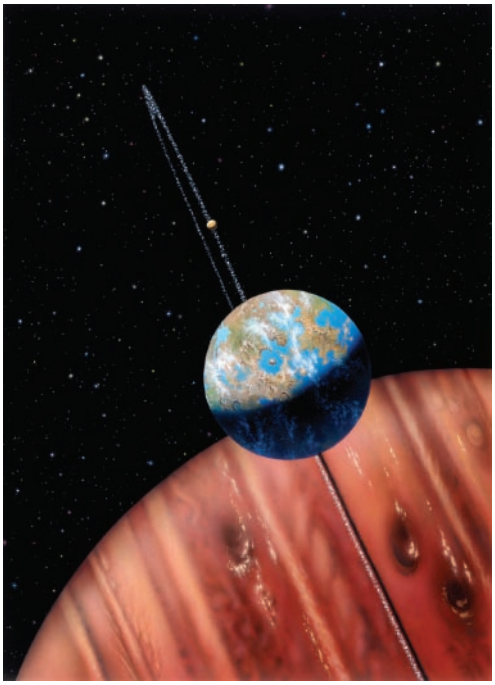
Planet (year discovered):	b (1996)
Avg Distance From Star: (Earth from Sun = 1 AU)	0.05 AU
Orbit:	3.3 days
Mass:	3.9 Jupiters

70 Virginis



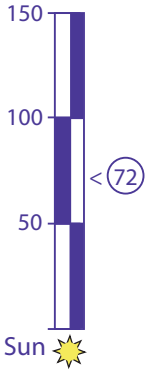
RA: 13h 28m
Dec: 13° 47'
mag: 5

The planet is shown with a ring and two moons. A small, gold moon and the other moon resembling Earth.

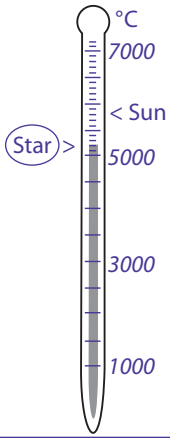


Star: 70 Virginis

How far in light years?



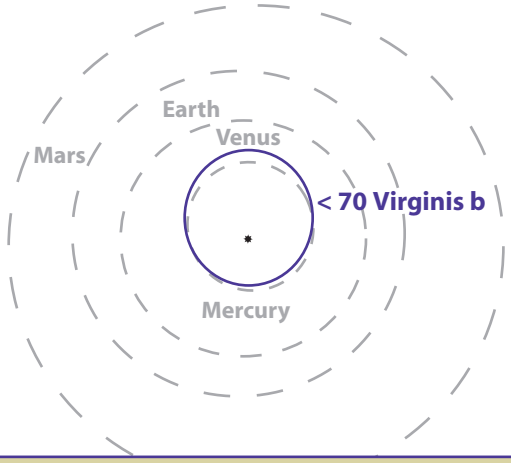
How Hot?



This massive planet is orbiting a star cooler than the Sun. It may have moons with liquid water. The planet is shown on the front with a ring and two moons. One moon is shown resembling Earth, having oceans and land.

Planet: 70 Virginis b

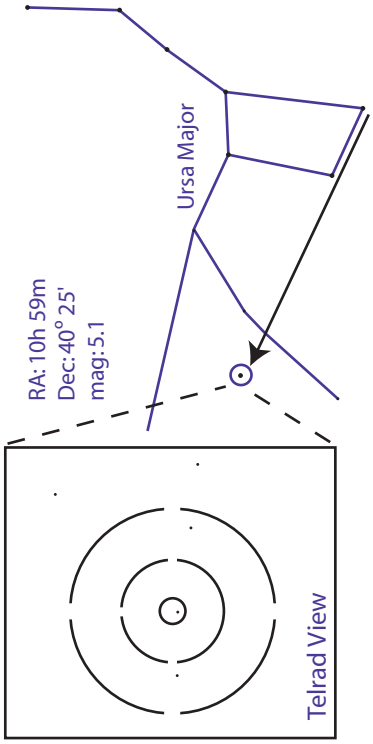
Star's System Compared to Our Solar System



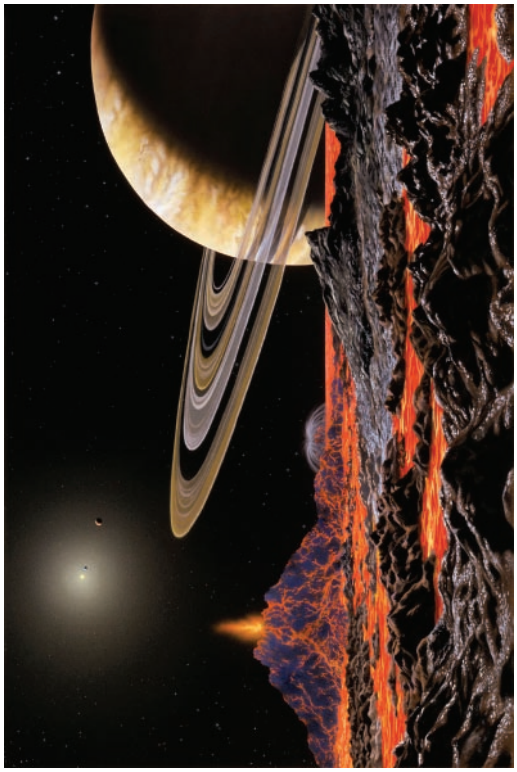
Planet (year discovered):	b (1996)
Avg Distance From Star: (Earth from Sun = 1 AU)	0.4 AU
Orbit:	117 days
Mass:	6.6 Jupiters

47 Ursae Majoris

RA: 10h 59m
Dec: 40° 25'
mag: 5.1



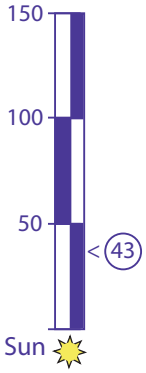
View from a possible moon of the outermost planet. Also shown: the confirmed inner planet and a possible "water world" close to the star.



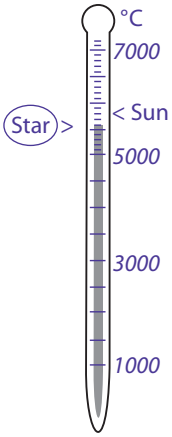
Star: 47 Ursae Majoris

Same Size as Our Sun

How far in light years?



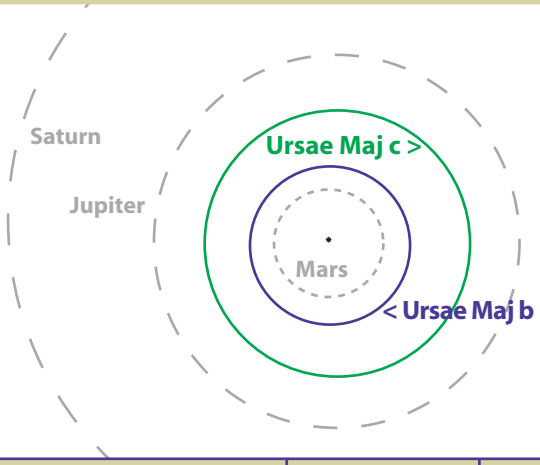
How Hot?



Two giant planets are orbiting in nearly circular orbits far from their star. This system is somewhat like our Solar System. Might rocky planets like Earth exist closer to the star?

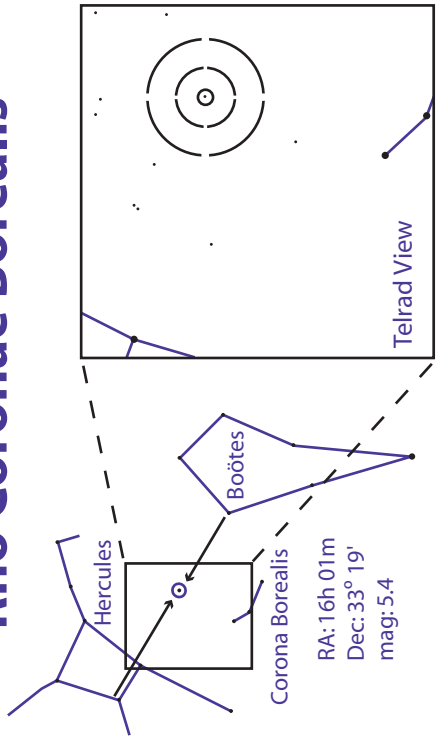
Planets: 47 Ursae Majoris b and c

Star's System Compared to Our Solar System

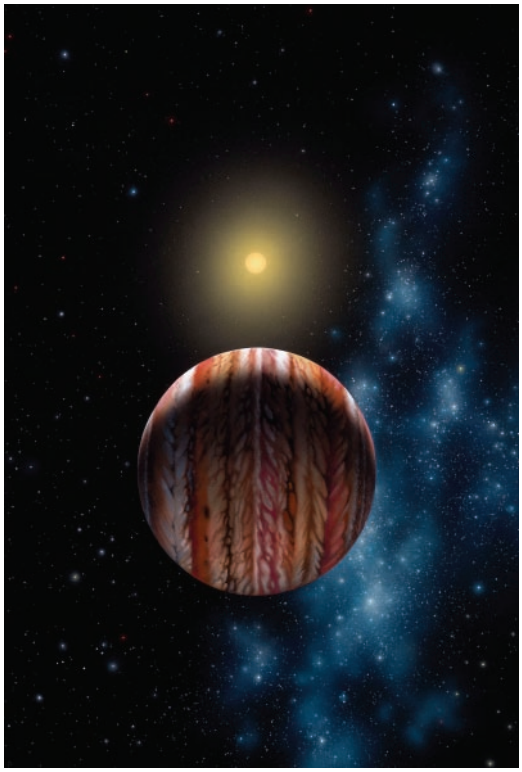


Planets (year discovered):	b (1996)	c (2001)
Avg Distance From Star: (Earth from Sun = 1 AU)	2.1 AU	3.7 AU
Orbit:	3 years	7.1 years
Mass:	2.4 Jupiters	76% of Jupiter

Rho Coronae Borealis



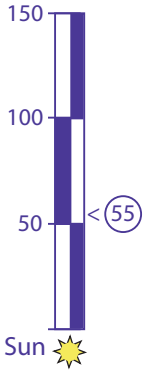
RA: 16h 01m
Dec: 33° 19'
mag: 5.4



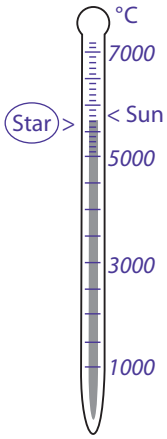
Jupiter-like planet orbits its star at about the same distance as Mercury orbits the Sun.

Star: Rho Coronae Borealis

How far in light years?



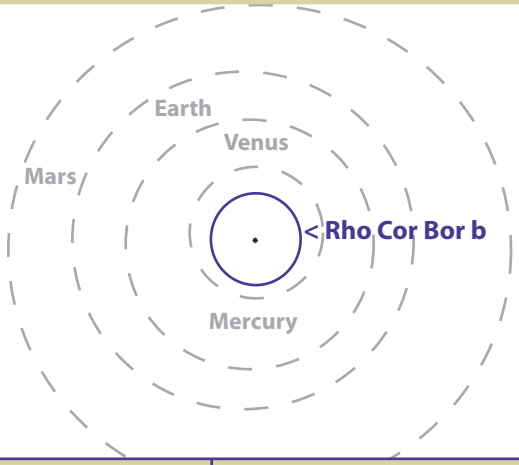
How Hot?



A belt of rocky/icy objects appears to orbit this star at about the same distance as the Kuiper Belt from our Sun. The occasional comet may appear in skies of this star's planet(s).

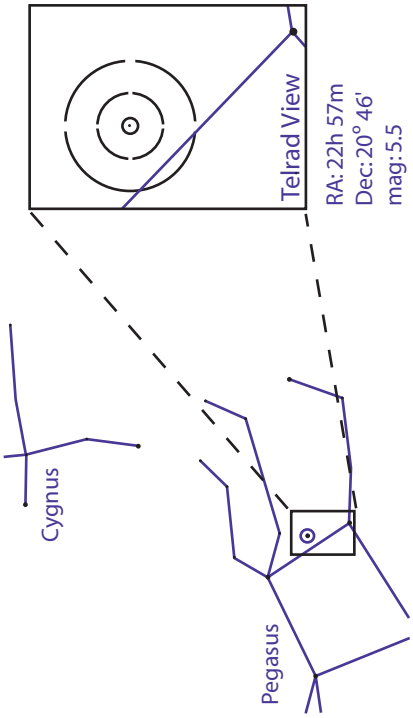
Planet: Rho Coronae Borealis b

Star's System Compared to Our Solar System



Planet (year discovered):	b (1997)
Avg Distance From Star: (Earth from Sun = 1 AU)	0.23 AU
Orbit:	39.6 days
Mass:	1.1 Jupiters

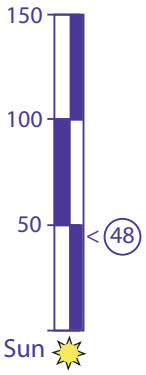
51 Pegasi



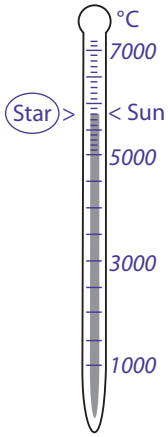
The "hot Jupiter" orbiting very close to its star.

Star: 51 Pegasi

How far in light years?



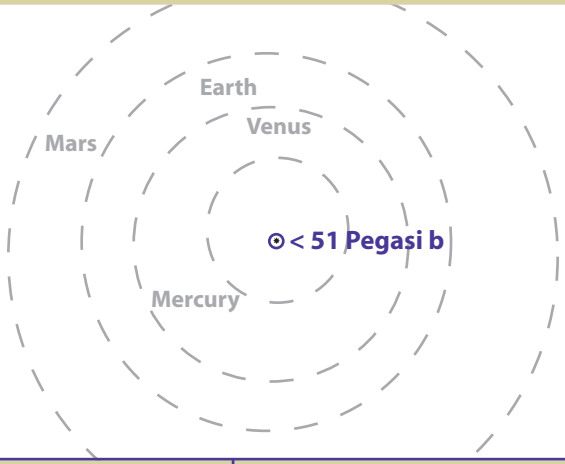
How Hot?



This star was the FIRST sun-like star discovered to have a planet – in 1995, the first evidence that other stars like our Sun have planetary systems.

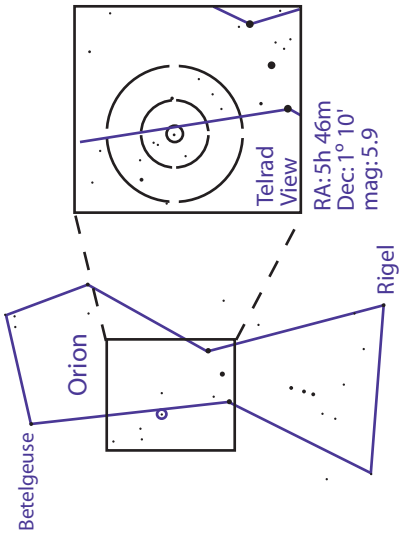
Planet: 51 Pegasi b

Star's System Compared to Our Solar System



Planets (year discovered):	b (1995)
Avg Distance From Star: (Earth from Sun = 1 AU)	0.05 AU
Orbit:	4.2 days
Mass:	50% of Jupiter

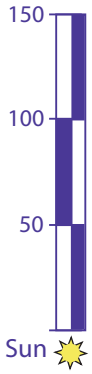
HD 38529 (Orion)



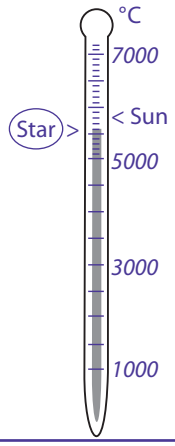
View from the surface of a hypothetical icy moon of the outermost planet, which is shown with rings and two other moons.

Star: HD 38529 (Orion)

How far in light years?



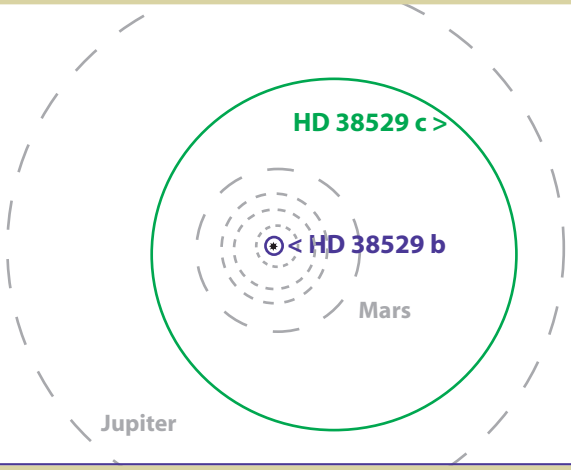
How Hot?



This star is very dim – it is about how bright our Sun would look from the distance of this star. Compare this "small" star to Orion's Betelgeuse – a red giant over 400 light years away or Rigel – a blue hot supergiant at over 750 light years.

Planets: HD 38529 b and c

Star's System Compared to Our Solar System



Planets (year discovered):	b (2000)	c (2002)
Avg Distance From Star: (Earth from Sun = 1 AU)	0.12 AU	3.5 AU
Orbit:	14.4 days	6 years
Mass:	77% of Jupiter	11.3 Jupiters