

In 1990, the only planets known to exist in the universe were the planets of our own solar system, but by 2009, thanks to the development of new technologies, hundreds of new planets have been found. And this number continues to increase.

These new planets are called **extrasolar planets**. **Extra** means “beyond” and **solar** means “sun,” so an extrasolar planet is a planet orbiting a star other than our sun.

Because of the limits of the telescopes and other technology that are employed in the search, most of the extrasolar planets we’ve discovered are very large. They have masses equal to or greater than Jupiter, the largest planet in our solar system. Also, they are often very close to their star. With the improvement of our equipment and methods, we are beginning to find planets that are nearer to the mass of Earth.

With current technology, locating extrasolar planets directly is not possible. Planets are visible because they reflect the light of the star they orbit. Even so, they are only about one one-thousandth as bright as the star, or less. Currently, our telescopes are unable to separate this small amount of reflected light from the tremendous amount of light given off by the star itself. Also, because stars are so far away, the distance between the star and its planet is too small for detection by present-day telescopes. (Consider trying to see the light from a small flashlight held right next to a really bright spotlight.) Astronomers are developing techniques that one day may help them see enough detail to overcome the challenges posed by distance and differences in brightness.

Direct imaging of planets is challenging indeed but in November 2008, the Hubble Space Telescope, using a coronagraph on board, detected a planet orbiting a bright star called Fomalhaut. Called Fomalhaut B, this planet has an orbital period of 800 years and a mass of less than 3 times that of Jupiter.

Checking In

1. How do astronomers detect extrasolar planets?
2. Why are extrasolar planets so hard to observe directly?

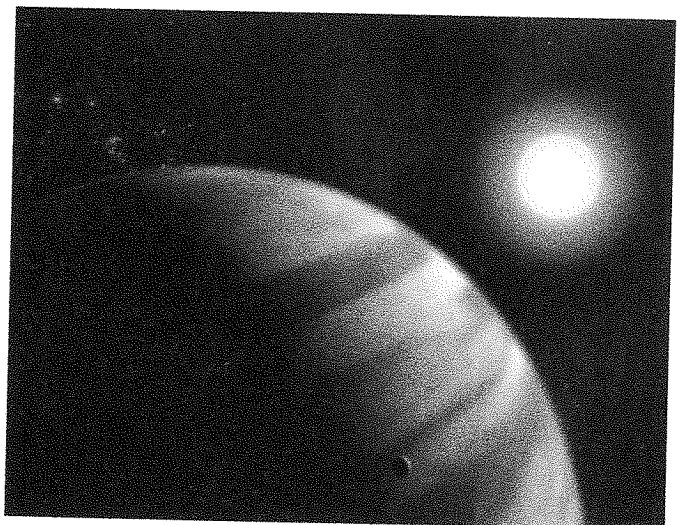


Figure 5-3: Artist's drawing of the extrasolar planet Tau Boötis Ab. The planet has a mass of about four Jupiters and orbits its star, Tau Boötis A in the constellation Boötes, every 3.3 days.