= Kepler @-@ 6b =

Kepler @-@ 6b is an extrasolar planet in the orbit of the unusually metal @-@ rich Kepler @-@ 6 , a star in the field of view of the NASA @-@ operated Kepler spacecraft , which searches for planets that cross directly in front of , or transit , their host stars . It was the third planet to be discovered by Kepler . Kepler @-@ 6 orbits its host star every three days from a distance of .046 AU . Its proximity to Kepler @-@ 6 inflated the planet , about two @-@ thirds the mass of Jupiter , to slightly larger than Jupiter 's size and greatly heated its atmosphere .

Follow @-@ up observations led to the planet 's confirmation , which was announced at a meeting of the American Astronomical Society on January 4 , 2010 along with four other Kepler @-@ discovered planets .

= = Discovery and naming = =

NASA 's Kepler satellite trails the Earth and continually observes a portion of the sky between the constellations Cygnus and Lyra . It is devised to search for and discover planets that transit , or cross in front of , their host stars with respect to Earth by measuring small and generally periodic variations in a star 's brightness . Kepler recognized a potential transit event around a star that was designated KOI @-@ 017 , which was named Kepler @-@ 6 after the confirmation of Kepler @-@ 6b . The star was designated " 6 " because it was the sixth planet to be observed (but the third planet to be discovered) by the Kepler satellite .

After the initial detection of a transit signal by Kepler , follow @-@ up observations were taken to confirm the planetary nature of the candidate . Speckle imaging by the WIYN Telescope was used to determine the amount of light from nearby , background stars that was present . If not accounted for , this light would have made Kepler @-@ 6 appear brighter than it actually was . Consequently , the size of Kepler @-@ 6b would have been underestimated . Radial velocity data was taken by HIRES at the Keck I telescope in order to determine the mass of the planet . Independently , observations were made with the Spitzer Space Telescope at infrared wavelengths of 3 @.@ 6 and 4 @.@ 5 micrometres . Along with additional data taken by Kepler , these observations detected the occultation and phase curves of Kepler @-@ 6b behind its star .

The confirmation of Kepler @-@ 6b was announced at the 215th meeting of the American Astronomical Society with the discoveries of planets Kepler @-@ 4b , Kepler @-@ 5b , Kepler @-@ 7b , and Kepler @-@ 8b on January 4 , 2010 .

= = Host star = =

Kepler @-@ 6 is a sunlike star in the Cygnus constellation . It is approximately 20 @.@ 9 % more massive than and 39 @.@ 1 % larger than the Sun . With an effective temperature of 5647 K , Kepler @-@ 6 is cooler than the Sun . It is predicted to be 3 @.@ 8 billion years old , compared to the Sun 's age of 4 @.@ 6 billion years . It is most notable for its unusually high metallicity for an exoplanet @-@ bearing star ; with an [Fe / H] = 0 @.@ 34 , Kepler @-@ 6 has 2 @.@ 18 times more iron than the Sun does . Kepler @-@ 6b is the only planet that has been discovered in the orbit of Kepler @-@ 6 .

= = Characteristics = =

Kepler @-@ 6b is a hot Jupiter , having a mass 0 @.@ 669 times that of Jupiter , but an average distance of only 0 @.@ 046 AU from its star and , thus , an orbital period of 3 @.@ 23 days . It is almost 10 times closer to its star than Mercury is from our Sun . As a result , Kepler @-@ 6b is strongly irradiated by its star , heating its atmosphere to a temperature of 1660 K and puffing it up to a size 1 @.@ 3 times that of Jupiter . It may also be the case that Kepler @-@ 6b has a thermal inversion of its atmosphere , where temperature increases with increasing distance from the center of the planet . However , additional observations are required to confirm or refute this possibility .