= Kepler @-@ 5b =

Kepler @-@ 5b is one of the first five planets discovered by NASA 's Kepler spacecraft . It is a Hot Jupiter that orbits a subgiant star that is more massive , larger , and more diffuse than the Sun is . Kepler @-@ 5 was first flagged as the location of a possibly transiting planet , and was reclassified as a Kepler Object of Interest until follow @-@ up observations confirmed the planet 's existence and many of its characteristics . The planet 's discovery was announced at a meeting of the American Astronomical Society on January 4 , 2010 . The planet has approximately twice the mass of Jupiter , and is about 1 @.@ 5 times larger . It is also fifteen times hotter than Jupiter . Kepler @-@ 5b orbits Kepler @-@ 5 every 3 @.@ 5 days at a distance of approximately 0 @.@ 051 AU (7 @.@ 6 Gm) .

= = Observational history = =

The Kepler spacecraft 's first days of science activity revealed a series of transit events , in which some body (such as a planet) crosses in front of , and therefore dims , its host star . Such objects were taken from the Kepler Input Catalog and reclassified as Kepler Objects of Interest . Kepler @-@ 5 was one of these objects of interest , and was given the designation KOI @-@ 18 .

After the stellar parameters were established , the Kepler science team ran models and fits to ensure that Kepler @-@ 5 's transit event was not a false positive , such as an eclipsing binary star . Once the planetary nature of Kepler @-@ 5b was established , the Kepler team searched for the planet 's occultation behind its star , hoping to find the temperature on its day side . They found both , and were able to set the equilibrium temperature of the planet . The use of speckle imaging using adaptive optics at the WIYN Observatory in Arizona and the Palomar Observatory in California isolated the starlight of Kepler @-@ 5 from background stars .

Use of the Fibre @-@ fed Echelle Spectrograph (FIES) at the Nordic Optical Telescope on the Canary Islands on June 4 , 2009 provided data that was used to determine the star 's stellar classification . The W.M. Keck Observatory 's High Resolution Echelle Spectrometer (HIRES) , which was used on June 3 ? 6 , 2009 , and July 2 ? 4 , 2009 , determined radial velocity measurements for the star , which helped to further define stellar parameters .

Kepler @-@ 5 has , as considered by the Kepler team , the potential for use in the study of planets in extreme conditions ; its high temperature , large size , and short orbital period contribute to the aforementioned conditions . The findings of the Kepler team , which also included planets Kepler @-@ 4b , Kepler @-@ 6b , Kepler @-@ 7b , and Kepler @-@ 8b , were announced at the 215th meeting of the American Astronomical Society of January 4 , 2010 .

= = Host star = =

Kepler @-@ 5 is a subgiant in the Cygnus constellation that is expected to soon deplete its hydrogen stores in the core and begin fusing hydrogen in the shell region surrounding the core . The star is 1 @.@ 374 times the mass of the Sun (another model suggests that Kepler @-@ 5 as a mass of 1 @.@ 21 times that of the Sun) , although it is more diffuse at 1 @.@ 793 times the Sun 's radius . The star 's metallicity is measured to be at [Fe / H] = 0 @.@ 04 , which means that Kepler @-@ 5 has 1 @.@ 10 times the levels of iron as the Sun does .

The star 's apparent magnitude is 13 @.@ 4 , meaning that it cannot be seen with the unaided eye .

= = Characteristics = =

Kepler @-@ 5b is a Hot Jupiter with a mass that is 2 @.@ 114 times that of Jupiter and a radius of 1 @.@ 431 times Jupiter 's radius . This also means that Kepler @-@ 5b is not very dense . The planet 's measured density is 0 @.@ 894 grams / cm3 , less than that of pure water and comparable only to the density of Saturn , which is approximately 0 @.@ 69 grams / cm3 . The planet has an

equilibrium temperature of 1868 K , making it fifteen times hotter than Jupiter .
Kepler @-@ 5b orbits its host star every 3 @.@ 5485 days at a mean distance of 0 @.@ 05064 AU . In addition , with an orbital inclination of 86.3º , Kepler @-@ 5b orbits Kepler @-@ 5 almost edge @-@ on with respect to Earth . In comparison , planet Mercury orbits the Sun at a distance of 0 @.@ 387 AU every 87 @.@ 97 days .