

= HD 40307 c =

HD 40307 c is an extrasolar planet orbiting the star HD 40307 , located 42 light @-@ years away in the direction of the southern constellation Pictor . The planet was discovered by the radial velocity method , using the HARPS apparatus , in June 2008 . Of the six proposed planets in the HD 40307 star system , it is the third largest , and has the second closest orbit from the star . The planet is of interest as this star has relatively low metallicity , supporting a hypothesis that different metallicities in protostars determine what kind of planets they will form .

= = Discovery = =

Like the other two exoplanets , HD 40307 b and HD 40307 d , orbiting the star HD 40307 , HD 40307 c was discovered by measuring variations in the radial velocity of HD 40307 caused by the star 's orbit around the center of mass of the planetary system . These measurements were made by the High Accuracy Radial Velocity Planet Searcher spectrograph apparatus (HARPS) at the La Silla Observatory in Chile 's Atacama Desert . The discovery of planets in the HD 40307 system was announced in an astrophysics convention that took place in Nantes , France in mid @-@ June 2008 .

= = Orbit and mass = =

HD 40307 c is the third most massive planet in the system , with a lower mass bound 6 @.@ 8 times the mass of the Earth . The planet orbits HD 40307 at about 0 @.@ 08 astronomical units (AU) , as compared to the Earth 's distance from the Sun at 1 AU ; as a result , one year on the planet constitutes approximately 9 @.@ 6 Earth days . Analysis of the radial velocity data used to detect the planet does not yield a statistically significant deviation from a circular orbit .

The star around which the planet HD 40307 orbits has a low metallicity , unusual when compared to other planet @-@ bearing stars . This supports a hypothesis concerning the possibility that the metallicity of stars during their births may determine whether a protostar 's accretion disk forms gas giants or terrestrial planets .

= = Characteristics = =

HD 40307 c has not been observed directly and likely does not transit . More specific characteristics (such as surface temperature , composition and radius) cannot be determined .

HD 40307 c has a small mass of at least 6 @.@ 9 times Earth 's , so it was first assumed terrestrial . Later in 2009 a study stated that if HD 40307 c is terrestrial , tidal heating would destabilise it , in a manner greater than this process crushes the Jovian moon Io . Such restrictions as bind terrestrial planets would not restrict ice giant planets like Neptune or Uranus . HD 40307 c might be a sub @-@ Neptune .

Since the same tides are predicted to result in the destruction of larger natural satellites of planets located close to their parent star , it is unlikely that HD 40307 c hosts any satellites .