= Upsilon Andromedae b =

Upsilon Andromedae b (abbreviated ? Andromedae b , ? And b) , occasionally designated Upsilon Andromedae Ab (to distinguish it from the red dwarf Upsilon Andromedae B) , also named Saffar , is an extrasolar planet approximately 44 light @-@ years away from the Sun in the constellation of Andromeda . The planet orbits the Solar twin star , Upsilon Andromedae A , approximately every five days . Discovered in June 1996 by Geoffrey Marcy and R. Paul Butler , it was one of the first hot Jupiters to be discovered . It is also one of the first non @-@ resolved planets to be detected directly . Upsilon Andromedae b is the innermost known planet in its planetary system .

In July 2014 the International Astronomical Union launched a process for giving proper names to certain exoplanets and their host stars . The process involved public nomination and voting for the new names . In December 2015 , the IAU announced the winning name was Saffar for this planet . The winning name was submitted by the Vega Astronomy Club of Morocco and honours the 11th Century astronomer Ibn al @-@ Saffar of Muslim Spain .

= = Discovery = =

Like the majority of known extrasolar planets , Upsilon Andromedae b was detected by the variations in its star 's radial velocity caused by the planet 's gravity . The variations were detected by making sensitive measurements of the Doppler shift of Upsilon Andromedae 's spectrum . The planet 's existence was announced in January 1997 , together with 55 Cancri b and the planet orbiting Tau Boötis .

Like 51 Pegasi b , the first extrasolar planet discovered around a normal star , Upsilon Andromedae b orbits very close to its star , closer than Mercury does to our Sun . The planet takes 4 @.@ 617 days to complete an orbit , with a semimajor axis of 0 @.@ 0595 AU .

A limitation of the radial velocity method used to detect Upsilon Andromedae b is that only a lower limit on the mass can be found . In the case of Upsilon Andromedae b , this lower limit is 68 @.@ 7 % of the mass of Jupiter , though depending on the inclination of the orbit , the true mass may be much greater . However , astronomers found recently that inclination of the orbital plane is around 25 ° and the true mass may be about 1 @.@ 4 MJ . Coplanarity is not to be assumed ; the mutual inclination between c and d is 35 degrees .

= = Physical characteristics = =

Given the planet 's high mass , it is likely that Upsilon Andromedae b is a gas giant with no solid surface .

The Spitzer Space Telescope measured the planet temperature , and found that the difference between the two sides of Upsilon Andromedae b of about 1 @,@ 400 degrees Celsius , ranging from minus 20 to 230 degrees to about 1 @,@ 400 to 1 @,@ 650 degrees Celsius . The temperature difference has led to speculation that Upsilon Andromedae b is tidal locked with the same side always facing Upsilon Andromedae A.

Sudarsky had , on the assumption that the planet is similar to Jupiter in composition and that its environment is close to chemical equilibrium , predicted Upsilon Andromedae b to have reflective clouds of silicates and iron in its upper atmosphere . The cloud deck instead absorbs the sun 's radiation ; between that and the hot , high pressure gas surrounding the mantle , exists a stratosphere of cooler gas . The outer shell of dark , opaque , hot cloud is assumed to consist of vanadium and titanium oxides (" pM planets ") , but other compounds like tholins cannot be ruled out yet .

The planet is unlikely to have large moons , since tidal forces would either eject them from orbit or destroy them on short timescales compared to the age of the system .

The planet (with 51 Pegasi b) was deemed a candidate for direct imaging by Planetpol . Preliminary results from polarimetric studies indicate that the planet has predominately blue color , is 1 @.@ 36 times as large and 0 @.@ 74 times as massive as Jupiter , meaning that the mean

density is 0.36g / cm3 . It has a geometric albedo of 0 @.@ 35 in visible light .

= = Effect on its sun = =

Upsilon Andromedae b appears to be responsible for increased chromospheric activity on its parent star . Observations suggest that there is a " hot spot " on the star around 169 ° away from the sub @-@ planetary point . This may be the result of interactions between the magnetic fields of the planet and the star . The mechanism may be similar to that responsible for the activity of RS Canum Venaticorum variable stars , or the interaction between Jupiter and its moon Io .