LARGEST EXOPLANETS

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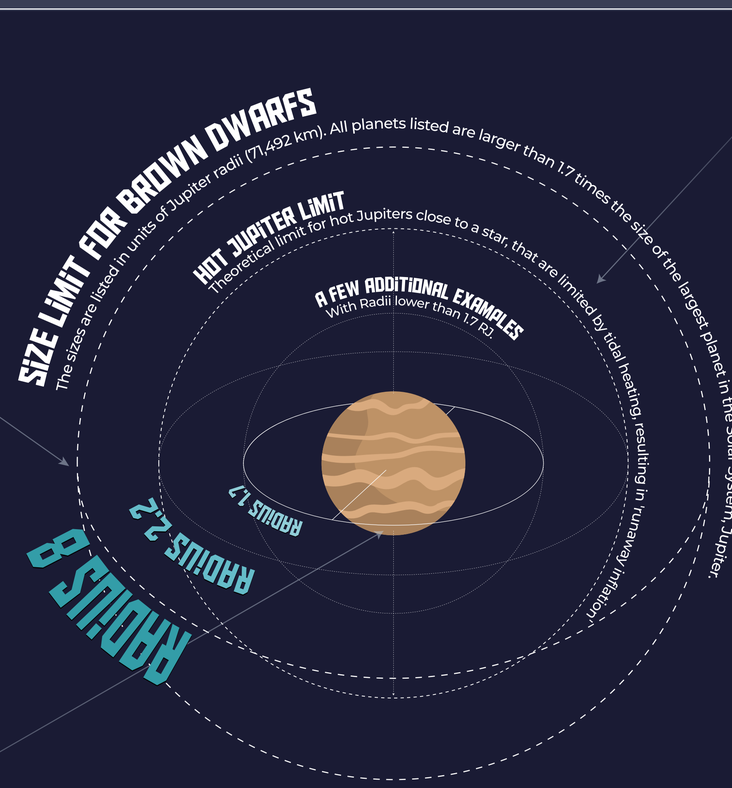
The sizes are listed in units of Jupiter radii (71,492 km).
All planets listed are larger than 1.7 times the size of the largest planet in the Solar System, Jupiter.
Some planets that are smaller than 1.7 RJ have been included for the sake of comparison.



JUPITER — Radius: 1 / 69,911 km
Largest planet in the Solar System, by radius and mass.

Radius 8

SiZE LiMiT FOR BROWN DWARFS

The sizes are listed in units of Jupiter radii (71,492 km). All planets listed are larger than 1.7 times the size of the largest planet in the Solar System, Jupiter.

Proplyd 133−353 Radius: 7.4±0.3−8.0±1.1

A candidate rogue planet / sub-brown dwarf with a photoevaporating disk. It is located in the Orion Nebula Cluster. At 500,000 years old, it is one of the youngest exoplanets known.

- Using PMS evolutionary models and a potential higher age of 1 Myr, the luminosity would be lower, and the planet would be smaller. However, this would require for the object to be closer as well, which is unlikely. Another distance estimate to the Orion Nebula Cluster would result in a luminosity 1.14 times lower and also a smaller radius.
- Instead of a photo-evaporating disk it may be an evaporating gaseous globule (EGG)'. If so, it has a mass of 2 - 28 MJ.
- A calculated radius thus does not need to be the radius of the (dense) core.

HD 100546 b Radius: 3.4

HD 100546, also known as KR Muscae, is a pre-main sequence star of spectral type B8 to A0 located 353 light-years (108 parsecs) from Earth in the southern constellation of Musca.[4] The star is surrounded by a circumstellar disk from a distance of 0.2 to 4 AU, and again from 13 AU out to a few hundred AU, with evidence for a protoplanet forming at a distance of around 47 AU.

Estimated to be less than 10 million years old, it belongs to Herbig Ae/Be stars, and also the nearest example to the Solar System.

- For the given radius, the object has a corresponding mass of 25 MJ. A separate numerical simulation gives 1.65 MJ. (The original estimate for the radius is 6.9 RJ.) It is a currently forming brown dwarf or planet.

GQ Lupi b Radius: 3.0±0.5, 4.6±1.5, 3.50 +1.50 −1.05, 3.77

GQ Lupi b, or GQ Lupi B, is a possible extrasolar planet, brown dwarf or sub-brown dwarf orbiting the star GQ Lupi. Its discovery was announced in April 2005. Along with 2M1207b, this was one of the first extrasolar planet candidates to be directly imaged. The image was made with the European Southern Observatory's VLT telescope at the Paranal Observatory, Chile on June 25, 2004.

GQ Lupi b has a spectral type between M6 and L0, corresponding to a temperature between 2,050 and 2,650 kelvins. Located at a projected distance of about 100 AU from its companion star, giving it an orbital period of perhaps about 1,200 years, it is believed to be several times more massive than Jupiter. Because the theoretical models which are used to predict planetary masses for objects in young star systems like GQ Lupi b are still tentative, the mass cannot be precisely specified — models place GQ Lupi b's mass anywhere between a few Jupiter masses and 36 Jupiter masses. At the highest end of this range, GQ Lupi b could be classified as a small brown dwarf, but at the lowest end of this range, it could be classified as an extremely large Jupiter-like exoplanet rather than a brown dwarf.

- If classified as an exoplanet, with a maximum radius of 6.5 times that of Jupiter (RJ) (or 930,000 km in diameter), this would make GQ Lupi b one of largest exoplanets discovered, although the size of the planet is shrinking as it evolves.
- As of 2006, the International Astronomical Union Working Group on Extrasolar Planets described GQ Lupi b as a "possible planetary-mass companion to a young star. GQ Lupi b is listed as a "confirmed planet" as of 2020.
- 21.5 MJ; at the highest end of this range, it may be classified as a young brown dwarf.

DH Tauri b Radius: 2.6±0.7−2.7±0.8, 2.68

DH Tauri, also known as DH Tau, is a type M star, located 140 parsecs (456.619 light years) away. It forms a binary system with DI Tauri 15" away, and has a substellar companion, either a brown dwarf or massive exoplanet.

- 14.2 MJ; at its largest, it would be classified as a brown dwarf.

ROXs 42Bb Radius: 2.5

ROXs 42Bb is a directly imaged planetary-mass companion[1] to the binary M star ROXs 42B, a likely member of the Rho Ophiuchi cloud complex. The companion was announced/discovered on October 17, 2013, by University of Toronto astronomer Thayne Currie.

The object has an estimated mass around 9 Jupiter masses, depending on the age of the star, similar to the masses of directly imaged planets around HR 8799 and beta Pictoris. However, it is unclear whether ROXs 42Bb formed like these planets via core accretion, by disk (gravitational) instability, or more like a binary star. Preliminary fits of the spectra and broadband photometry to atmospheric models imply a radius of 2.43 ± 0.18 RJ for an effective temperature of about 2,000 K or a radius of 2.55 ± 0.20 RJ for about 1950 K. Like Beta Pictoris b , ROXs 42Bb's atmosphere is likely very cloudy and dusty.

- This hot, massive planet (9+6−3 MJ) varies from 0.9 RJ to 3 RJ.

OTS 44 Radius: 2.24−5.55

OTS 44 is a free-floating planetary-mass object or brown dwarf located at 550 light-years (170 pc) in the constellation Chamaeleon near the reflection nebula IC 2631. It is among the lowest-mass free-floating substellar objects, with approximately 11.5 times the mass of Jupiter, or approximately 1.1% that of the Sun. Its radius is not very well known and is estimated to be 23–57% that of the Sun.

OTS 44 was discovered in 1998 by Oasa, Tamura, and Sugitani as a member of the star-forming region Chamaeleon I. Based upon infrared observations with the Spitzer Space Telescope and the Herschel Space Observatory, OTS 44 emits an excess of infrared radiation for an object of its type, suggesting it has a circumstellar disk of dust and particles of rock and ice. This disk has a mass of at least 10 Earth masses. Observations with the SINFONI spectrograph at the Very Large Telescope show that the disk is accreting matter at the rate of approximately 10−11 of the mass of the Sun per year. It could eventually develop into a planetary system. Observations with ALMA detected the disk in millimeter wavelengths. The observations constrained the dust mass of the disk between 0.07 and 0.63 ME, but these mass estimates are limited by assumptions on poorly constrained parameters.

- Very likely a brown dwarf or sub-brown dwarf, which it may be the least massive free-floating substellar objects. It is surrounded by a circumstellar disk of dust and particles of rock and ice.

Radius 1.7

A FEW ADDiTiONAL EXAMPLES

With Radii lower than 1.7 RJ.

1RXS 1609b Radius: 1.664

Likely a brown dwarf.

PSO J318.5−22 Radius: 1.53

An extrasolar object that does not seem to be orbiting any stellar mass, see: rogue planet.

HD 100546 c Radius: 1.265

Still disputed.

HR 2562 b Radius: 1.1

Most massive planet with a mass of 30 MJ, although according to most definitions of planet, it may be too massive to be a planet, and may be a brown dwarf instead.

Beta Pictoris b Radius: 1.65

Likely the second most massive object in its namesake system.

HD 209458 b Radius: 1.35

The first exoplanet whose size was determined.
Named after a prominent Egyptian deity, 'Osiris'.

Kepler−39b Radius: 1.22

One of the most massive exoplanets known.

HIP 11915 b Radius: 1

This exoplanet is an analogue to Jupiter, having a similar radius, mass and temperature, and it is orbiting a star analogous to the Sun.

PSO J318.5−22 Radius: 1.53

An extrasolar object that does not seem to be orbiting any stellar mass, see: rogue planet.

TrES−2b (Kepler−1b) Radius: 1.272

Darkest known exoplanet due to an extremely low geometric albedo. It absorbs 99% of light.

Coconuts−2b Radius: 1.12±0.04

The exoplanet with the longest orbital period, of 1100000 years (around one megannum). It is located 7,506 astronomical units (0.11869 ly) from its star.

Jupiter Radius: 1 / 69,911 km

Largest planet in the Solar System, by radius and mass.

- Red — Probably brown dwarfs (based on mass)
- Yellow — Probably sub−brown dwarfs (based on mass)
- Blue — Probably planets (based on mass)

What are those colors stands for?

Radius 2.2

HOT JUPiTER LiMiT

Theoretical limit for hot Jupiters close to a star,
that are limited by tidal heating, resulting in 'runaway inflation'

CT Chamaeleontis b Radius: 2.2 +0.81 −0.8

CT Chamaeleontis (CT Cha) is a T Tauri star - a primary of the star system in the constellation of Chamaeleon. It has an apparent visual magnitude which varies between 12.31 and 12.43. The star is still accreting material at rate 6×10−10 M/year.

17 MJ; is likely a brown dwarf.forming brown dwarf or planet.

XO−6b Radius: 2.07±0.22 +0.096 −0.077

4.4 MJ; a very puffy Hot Jupiter

HAT−P−41b Radius: 2.05±0.50

1.19 MJ; a very puffy Hot Jupiter.

HIP 65 Ab Radius: 2.03 +0.61 −0.45

3.213 MJ; a very puffy Hot Jupiter

WASP−17b Radius: 1.991±0.081

Was the largest known planet in 2012. At only 0.486 MJ, this Hot Jupiter is extremely low density at 0.08 g/cm3 which make it is one of the most puffy planet known. This estimate gives also a range from 1.411 RJ to 2.071 RJ.

HAT−P−32b Radius: 1.980±0.045

0.941 (± 0.166) MJ; a very puffy Hot Jupiter.
Other estimates give 1.789±0.025 RJ.s

WASP−12b Radius: 1.937±0.056

This planet is so close to its parent star that its tidal forces are distorting it into an egg shape. As of September 2017, it has been described as "black as asphalt", and as a "pitch black" hot Jupiter as it absorbs 94% of the light that shines on its surface.

PDS 70 b Radius: 1.93 +0.26 −0.08 − 2.72 +0.39 −0.34

PDS 70 (V1032 Centauri) is a very young T Tauri star in the constellation Centaurus. Located 370 light-years (110 parsecs) from Earth, it has a mass of 0.76 M and is approximately 5.4 million years old. The star has a protoplanetary disk containing two nascent exoplanets, named PDS 70b and PDS 70c, which have been directly imaged by the European Southern Observatory's Very Large Telescope. PDS 70b was the first confirmed protoplanet to be directly imaged.

51 Pegasi b Radius: 1.9±0.3

First exoplanet to be discovered orbiting a main-sequence star. Prototype hot Jupiter.

KELT−9b Radius: 1.891 +0.061 −0.055

The hottest confirmed exoplanet known.

HAT−P−65b Radius: 1.89±0.13

HAT-P-65 is a faint star located in the equatorial constellation Equuleus. With an apparent magnitude of 13.16, it requires a telescope to be seen. The star is located 2,460 light-years (750 pc) away from Earth, but is drifting close with a radial velocity of -48 km/s.

WASP−121b Radius: 1.865±0.044

WASP-121b, formally named Tylos, is an exoplanet orbiting the star WASP-121.WASP-121b is the first exoplanet found to contain water in an extrasolar planetary stratosphere (i.e., an atmospheric layer in which temperatures increase as the altitude increases). WASP-121b is in the constellation Puppis, and is about 858 light-years from Earth.

C−Oph 98 b Radius: 1.86±0.05

CFHTWIR-Oph 98 B is a substellar object, either an exoplanet or a sub-brown dwarf that orbits CFHTWIR-Oph 98 A, a M-type brown dwarf. The pair form a binary system.

WASP−76b Radius: 1.83 +0.06 −0.04

The tidally-locked planet where winds move 18,000 km/h, and where molten iron rains from the sky due to daytime temperatures exceeding 2,400 °C (4,350 °F)

HAT−P−33b Radius: 1.827±0.29

HAT-P-33b is a planet in the orbit of HAT-P-33, which lies 1,310 light years away from Earth. Its discovery was reported in June 2011, although it was suspected to be a planet as early as 2004. The planet is about three-fourths the mass of Jupiter, but is almost eighty percent larger than Jupiter is; this inflation has, as with the discovery of similar planets WASP-17b and HAT-P-32b, raised the question of what (other than temperature) causes these planets to become so large.

TYC 899−1 b Radius: 1.82±0.08 +0.3 −0.7

On 22 July 2020, astronomers announced images, for the first-time, of multiple extrasolar bodies orbiting a star, TYC 8998-760-1, nearly identical to the Sun, except for age. TYC 8998-760-1 is only 27 Ma old while the Sun is 4,500 Ma, and its largest orbital body (TYC 8998-760-1 b) is 22 ± 3 MJ; likely making it a brown dwarf.

U−Andromedae b Radius: 1.8

Upsilon Andromedae b (υ Andromedae b, abbreviated Upsilon And b, υ And b), formally named Saffar, is an extrasolar planet approximately 44 light-years away from the Sun in the constellation of Andromeda. The planet orbits its host star, the F-type main-sequence 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.

Cha 773444 Radius: 1.8

A rogue planet (Likely a sub-brown dwarf) that is surrounded by a protoplanetary disk. It is one of youngest free-floating substellar objects with 0.5–10 Myr.

GSC 00210 b Radius: 1.8±0.5

16 MJ, likely brown dwarf

TrES−4b Radius: 1.799±0.063

This planet has a density of 0.2 g/cm3, about that of balsa wood, less than Jupiter's 1.3g/cm3.

TOI−640 b Radius: 1.771 +0.067 −0.066

TOI-640 b is an exoplanet that was suspected since 2019, discovery been confirmed by TESS team in January 2021. It is located 1115 light years away from Earth, orbiting primary F-class star in the binary star system with red dwarf and has an orbital period of 5 days.

Kepler−12b Radius: 1.754 +0.031 −0.036

Kepler-12b is a hot Jupiter that orbits G-type star Kepler-12 some 900 parsecs (2,900 ly) away. The planet has an anomalously large radius that could not be explained by standard models at the time of its discovery, almost 1.7 times Jupiter's size while being 0.4 times Jupiter's mass. The planet was detected by the Kepler spacecraft, a NASA project searching for planets that transit (cross in front of) their host stars. The discovery paper was published on September 5, 2011.

KELT−20b Radius: 1.735 +0.07 −0.07 , 1.741 +0.069 −0.072

KELT-20b, also known as MASCARA-2b, was an exoplanet announced in 2017. It is an Ultra-hot Jupiter orbiting an A-type star. The carbon monoxide, steam and neutral iron detection in the atmosphere of KELT-20b was announced in 2022.

WASP−78b Radius: 1.70±0.04

WASP-78, is a single F-type main-sequence star about 2500 light-years away. It is likely to be younger than the Sun at 3.4 billion years. WASP-78 is depleted in heavy elements, having a 45% concentration of iron compared to the Sun.