

Is our solar system weird?

July 18 2014, by Brian Koberlein



This artist's view shows an extrasolar planet orbiting a star (the white spot in the right). Credit: IAU/M. Kornmesser/N. Risinger (skysurvey.org)

Is our Solar System normal? Or is it weird? How does the Solar System fit within the strange star systems we've discovered in the Milky Way so far?

With all the beautiful images that come down the pipe from Hubble, our Solar System has been left with celestial body image questions rivaling that of your average teenager. They're questions we're all familiar with. Is my posture crooked? Do I look pasty? Are my arms too long? Is it



supposed to bulge out like this in the middle? Some of my larger asteroids are slightly asymmetrical. Can everyone tell? And of course the toughest question of all... Am I normal?

The idea that <u>stars</u> are suns with <u>planets</u> orbiting them dates back to early human history. This was generally accompanied by the idea that other <u>planetary systems</u> would be much like our own. It's only in the last few decades that we've had real evidence of planets around other stars, known as exoplanets. The first extrasolar planet was discovered around a pulsar in 1992 and the first "hot jupiter" was discovered in 1995.

Most of the known exoplanets have been discovered by the amazing Kepler spacecraft. Kepler uses the transit method, observing stars over long periods of time to see if they dim as a planet passes in front of the star. Since then, astronomers have found more than 1700 exoplanets, and 460 stars are known to have multiple planets. Most of these stellar systems are around main sequence stars, just like the Sun. Leaving us with plenty of systems for comparison.

So, is our Solar System normal? Planets in a stellar system tend to have roughly circular orbits, just like our Solar system. They have a range of larger and smaller planets, just like ours. Most of the known systems are even around G-type stars. Just like ours....and we are even starting to find Earth-size planets in the habitable zones of their stars. JUST LIKE OURS!

Not so fast...Other stellar systems don't seem to have the division of small rocky planets closer to the star and larger gas planets farther away. In fact, large Jupiter-type planets are generally found close to the star. This makes our <u>solar system</u> rather unusual.

Computer simulations of early planetary formation shows that large planets tend to move inward toward their star as they form, due to its



interaction with the material of the protoplanetary disk. This would imply that large planets are often close to the star, which is what we observe. Large planets in our own system are unusually distant from the Sun because of a gravitational dance between Jupiter and Saturn that happened when our Solar System was young.

Although our Solar System is slightly unusual, there are some planetary systems that are downright quirky. There are planetary systems where the orbits are tilted at radically different angles, like Kepler 56, and a scifi favorite, the planets that orbit two stars like Kepler 16 and 34. There is even a planet so close to its star that its year lasts only 18 hours, known 55 Cancri e.



Artist's impression of the solar system showing the inner planets (Mercury to Mars), the outer planets (Jupiter to Neptune) and beyond. Credit: NASA

And so, the Kepler telescope has presented us with a wealth of exoplanets, that we can compare our beautiful Solar System to. Future



telescopes such as Gaia, which was launched in 2013, TESS and PLATO slated for launch in 2017 and 2024 will likely discover even more. Perhaps even discovering the holy grail of exoplanets, a habitable planet with life...

And the who knows, maybe we'll find another planet... just like ours.

Source: <u>Universe Today</u>

Citation: Is our solar system weird? (2014, July 18) retrieved 1 May 2024 from <u>https://phys.org/news/2014-07-solar-weird.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.