

Astronomers find baby planet

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Scottish astronomers have found a baby planet still in the stages of forming and encased within a 'womb' of gas.

The embryonic planet, thought to be the youngest ever seen, was discovered by Dr Jane Greaves of the University of St Andrews and colleagues from across the UK and the US.

The finding provides a unique view of how planets take shape, because the supporting images also shows the womb-like parent disk material from which the new planet formed. The 'protoplanet', called HL Tau b after its parent star HL Tau, could be as young as a few hundred years old.

Dr Greaves, of the School of Physics & Astronomy at St Andrews, explained, "The planet will probably take millions of years to settle down into its final form of something like Jupiter. So we really are seeing it very early - even a bit like the first cells that make up a human embryo in the womb."

The team made the discovery when studying HL Tau, a star thought to be less than 100,000 years old - 'young' when compared to the Sun which is 4600 million years old. Around 520 light years away and in the constellation of Taurus, HL Tau's unusually massive and bright surrounding disk of gas and rocky particles make it an excellent place to search for signs of forming planets.

The outcome was a result of a rare opportunity to use a large array of

telescopes across the US. The 'very sharp' images taken of HL Tau and its surroundings revealed the presence of super-large rocky particles about the size of pebbles, a clue that rocky material is beginning to clump together to form planets.

The big surprise was that, as well as detecting super-large dust in the disk around HL Tau, an extra bright 'clump' was seen in the image. It confirms tentative 'nebulousity' reported a few years earlier but shows the same system in much greater detail. The finding was confirmed by readings from telescopes based at the Jodrell Bank Observatory in Cheshire and supported by computer simulations from the University of Edinburgh.

Dr Greaves comments, "We see a distinct orbiting ball of gas and dust, which is exactly how a very young protoplanet should look. In the future, we would expect this to condense out into a gas giant planet like a massive version of Jupiter. The protoplanet is about 14 times as massive as Jupiter and is about twice as far from HL Tau as Neptune is from our Sun."

The researchers think the planet may have been 'tweaked' into forming after an encounter with another young star about 1600 years ago in a 'flyby' incident. They say that the planet formed because of gravitational instability in the surrounding disk, which allows small regions to separate out and cool down into self-contained structures.

"Whether the protoplanet formed in only the last few hundred years, or sometime in the 100000 years since the birth of HL Tau, the images provide a unique view of planet formation in action, and the first picture of a protoplanet still embedded in its birth material," said Dr Greaves.

Dr Greaves will talk about the discovery at the RAS National Astronomy Meeting in Belfast today.

Source: University of St Andrews

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