Astronomers working with the Spitzer Space Telescope have recently had some rather strange observations of a young star. Something appears to be pushing around a large clump of material that is in orbit of this star, and it's moving fast enough to make a difference in observations along a five month period. And these observations have given the team working with the Spitzer Space Telescope a rare new look into the early stages of planetary formation.

Hello, I'm Marc Helou

[slated intro...]

Astronomers know that after a star has been born, it still retains a large amount of dust, gas, and sometimes larger pieces of debris that remains in orbit. Over a period of time, typically measured in millions of years, these materials flatten out into a large pancake-like disk and then clump together forming larger and larger bodies. Over time, full sized planets form and a more mature and stable planetary system settles in, much like our own Solar system.

The predominant theory of planet formation is based on the idea that once a star and its orbiting dust clouds have settled, the gas and dust and debris begin a snowball effect, slowly gathering up more and more material through orbits, eventually creating large enough bodies that carve out paths of the gas and debris. over time most of the debris will get picked up by the forming planets, sometimes leaving rings of debris, much like the asteroid belt in our solar system.

Before the launch of the Spitzer Space Telescope in 2003, there were only a handful of stars that were known to have these forming planetary disks around them. But with Spitzer's infrared vision, dozens more of these transitional systems have been found around our Milky Way Galaxy. The Spitzer Space Telescope has been able to look in on these forming planetary systems and scientists are able to determine how far along in the development process the planets are by measuring the amount of light being reflected by the system.

James Muzerolle and his team at the Space Telescope Science Institute in Baltimore, Maryland, began their examination of these existing transitional disks when they started to take a closer look at the LRLL 31 star system, spending almost five months observing their stunning astronomical find.

While observing LRLL 31 over a five month period, Muzerolle and his research team had the opportunity to see a peculiar facet in the planetary development of this star system. Results from their observing showed some very unexpected behavior of reflected light, often times showing large differences in observations over as little time as a week! The observations have been showing light reflecting from the inner region of the star's disk changing predominantly at a bi-weekly rate.

James Muzerolle is the first author on a paper recently published on these exciting new observations. "*We don't know if planets have formed, or will form, but we are gaining a better understanding of the properties and dynamics of the fine dust that could either become, or indirectly shape, a planet. This is a unique, real-time glimpse into the lengthy process of building planets*."

One explanation to these wild results is that some object, maybe an already developed planet or even a nearby star, is exerting extreme gravitational forces onto the disk material. These forces are causing waves and large lumps in the planetary material as it orbits the star.

This companion object that Muzerolle and his team believe is orbiting the star is theorized to be much closer in distance to the star than our planet Earth is to our own Sun, possibly a tenth of the distance. This distance also explains the speed at which the object must be traveling, which is also why the astronomers are able to view the changes around this star in such a small timescale.

The astronomical team at the Space Telescope Science Institute in Baltimore, Maryland will continue to follow up their breakthrough discovery with ground based telescopes in order to get a better look at the companion object in orbit and to see how the disks are forming. The Spitzer Space Telescope will continue to peer in on LRLL 31 to help keep track of changes in the star system.

For the Spitzer Science Center, i'm Marc Helou

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