

## Unsettled Youth: Spitzer Observes a Chaotic Planetary System

During the infancy of our solar system, when our planets had not yet settled down into their orbits, this was a dangerous place to live. The planets wobbled and jostled around left over asteroids, comets and other debris floating in between their orbits, causing frequent collisions throughout our solar system.

Hello, I'm Marc Helou

[slated intro]

Scientists using NASA's Spitzer Space Telescope have recently been able to examine a young star and its planets that seem to be in this same early evolutionary stage of development. The star, called HR 8799, was in the news back in November of 2008, for being one of the first star systems imaged with a planet in orbit. The W.M. Keck and the Gemini Observatories, both based in Hawaii, snapped the original pictures. We were treated to the images of three large planets orbiting the star, each planet roughly ten times the mass of Jupiter. Because HR 8799 is roughly 125 light years from our own sun, scientists were unsure whether Spitzer would be able to capture a picture of the planets orbiting inside the star system.

The team that handled this particular observation was led by Kate Su of the University of Arizona, in Tucson. To their amazement and delight, Spitzer captured wonderfully accurate measurements of the HR 8799 system. From their observations, Su and her team were able to find existence of a warm inner core, and a larger cooler halo surrounding the entire system, all of which measures 2,000 Astronomical Units across, almost eighteen and a half trillion miles!

This larger halo which is composed of fine dust is considered rather unusual. Scientists believe that all this dust is being kicked up by the collisions of smaller bodies, such as comets and asteroids. Kate Su and her team do not believe that the large planets have yet had the chance to settle down into their own stable orbits, and this is causing all of the smaller bodies in the star system to migrate around wildly and collide with each other.

Even our own solar system went through a similar phase of bombardment and chaos in its own youth. Scientists believe that while Jupiter and Saturn had not yet settled in their own orbits they were causing comets and other objects to fly wildly through our system, hitting other small and large bodies. This chaotic environment is what most likely caused the first delivery of water onto our Earth's surface, arriving via wandering comets, which are very similar to large icy snow balls, and the arrival of these comets is also attributed to helping life form on our own planet. Because of their observations, scientists believe that it may take a long time before the dust settles around the planets orbiting the HR 8799 system.

With these new insights, towards the chaotic beginnings of a planetary system, scientists and astronomers are better able to piece together and understand not only the evolutionary cycle of star systems and their planets, but to also understand the building blocks of life.

For the Spitzer Science Center, I'm Marc Helou

[slated outro]