

13 March 2008

By: Gabriel Gache, Science News Editor

Image of Cone Nebula  
NASA

## [Distant Stars Show Presence of Dust Grains](#)

### *Earth-like planets may also form around distant stars*

How Earth-like planets form around other planets is not quite known yet, albeit astronomers discover with each passing day that planets are forming in other distant star systems. According to a study presented last week, such a planet forming solar system seems to be forming around a series of stars located about 2,400 light years away from Earth, in the Cone Nebula. The stellar accumulation is dubbed KH-15D and lies in the Monoceros constellation. It seems that the disk of matter, orbiting each of the stars in the KH-15D cluster, is located at about the same distance as that of the Earth around the Sun, about 150 million kilometers. Christopher Johns-Krull, co-author of the study and assistant professor of physics and astronomy at Rice University, said: "Precisely how and when planets form is an open question." However, Johns-Krull believes that they should form just about around any new star surrounded by an accretion disk of matter. Dust grains eventually pull together to become small rocks, collapsing into large bodies: boulders, proto-planets and finally a fully-developed planet. Most of the time, astronomers use infrared signatures to determine whether or not large quantities of dust particles are in orbit around the respective star. But by doing so, they lose the ability to precisely determine exactly what is the position of the dust disk in relation to the star, whether it is in a close orbit around the star or it has started a planet-formation process.

**Change in strategy** The Cone Nebula, containing stars only about 3 million years old, presented astronomers with a unique opportunity to study planet formation process due to its wild variation in brightness in relation with time. The case of discovering the KH-15D stellar system represents only a coincidence, because the disk of dust orbiting one of the stars is blocking the star from the direct view. Even more intriguing is the fact that the respective star is part of a binary system, with the companion star orbiting the main component in a highly eccentric orbit which takes it over and below the disk of matter. This unique configuration allows it to illuminate the disk of matter from different angles, allowing Johns-Krull to study the system by comparing the situations when the companion is in view and behind the main star, in eclipse. "It's a very fortuitous arrangement because when the star is there all the time, it's so bright that we can't see the sand," said Johns-Krull. Photometric and spectrographic analysis conducted over a period of 12 years, with the help of McDonald Observatory, the Keck Observatory in Hawaii and the VLT, has finally revealed how light from the companion star is being reflected on the disk of matter, to reveal its chemical composition. "That's very exciting because it opens up so many doors for new type of research on this disk," said co-author of the study William Herbst of Wesleyan University.