# Formation of planetary system discovered

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An international team of astronomers, including Australians, has discovered new evidence that challenges the traditional belief that new planetary systems only form around young stars in stellar nurseries.

Professor Peter Tuthill from Sydney University's School of Physics and graduate Michael Ireland are part of the team which recently observed material from the dying star, Mira A, being captured into a disc around its companion Mira B, laying the foundations for a new planetary system.

The observation, presented at the January meeting of the American Astronomical Society, challenges the belief that the dusty discs, where planets form, are only found around young stars and not in the environment of a dying star.

Prof Tuthill said astronomers traditionally associated the death of a star with the death of its planetary system, but here the opposite was happening.

"It came as a real revelation to see this faint mote of dust, harbouring all the new possibilities of new worlds in formation, against the hostile environment of the 'Red Giant'," Prof Tuthill said.

Mira A, known as the Red Giant, is one of the most studied stars in the galaxy and was first observed about 400 years ago.

The star, located about 350 light years away in the constellation of Cetus, is visible to the naked eye for about a month at a time due to its changing brightness.

Mira A, which was once very similar to our sun, is now a dying star and is losing its dusty outer layer at a rate of about one earth mass every seven years.

Astronomers have calculated about one per cent of the material being captured in the gravitational field of its companion star Mira B, which is half the size of the sun.

The observations, thought impossible to detect because of blurring by atmospheric turbulence, were made using new imaging methods at the 10 metre Keck I telescope in Hawaii and the eight-metre Gemini South telescope in Chile.

The intense radiation from Mira A, which is 5,000 times brighter than the sun, heats the edge of the disc to about earth's temperature causing it to glow in the infrared.

Prof Tuthill said observing Mira A in the infrared was like "staring straight down the barrel of one of the brightest searchlights in the galaxy".

Realigning the position of the mirrors on the Keck I telescope, along with the mid-infrared technology, allowed researchers to show the material was the edge of a disc and not a clump in the wind from Mira A.

Mr Ireland said the research opened up new ways to search for new planets, by searching in double star systems that contain white dwarfs.

"The expected abundance of these systems means that we can find planets that we know are young around stars like our sun," Mr

Ireland said.

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