

## Scientists discover new planet orbiting dangerously close to giant star

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The scientists used the Hobby-Eberly Telescope, one of the largest and most powerful telescopes in the world, to make its discovery of the extrasoslar planet. Credit: Thomas Sebring, Hobby-Eberly Telescope

A team of astronomers from Penn State and Nicolaus Copernicus University in Poland has discovered a new planet that is closely orbiting a red-giant star, HD 102272, which is much older than our own Sun. The planet has a mass that is nearly six times that of Jupiter, the largest planet in our solar system.

The team includes Alexander Wolszczan, the discoverer of the first planets ever found outside our solar system, who is an Evan Pugh Professor of Astronomy and Astrophysics and the director of the Center for Exoplanets and Habitable Worlds at Penn State; and Andrzej Niedzielski, who leads his collaborators in Poland. The team suspects that a second planet may be orbiting HD 102272, as well. The findings,



which will be published in a future issue of *The Astrophysical Journal*, shed light on the ways in which aging stars can influence nearby planets.

Scientists already know that stars expand as they age and that they eventually may gobble up adjacent planets. In fact, scientists expect our own planet to be swallowed up by the Sun in about a billion years. But what scientists don't yet understand fully is how aging stars influence nearby planets before they are destroyed. The team's newly discovered planet is interesting because it is located closer to a red-giant star than any other known planet.

"When red-giant stars expand, they tend to eat up the nearby planets," said Wolszczan. "Although the planet we discovered conceivably could be closer to the star without being harmed by it, there appears to be a zone of avoidance around such stars. Our discovery pushes it back to about 0.6 astronomical units, which is the size of the new planet's orbit. It is important to find out why planets don't want to get any closer to stars, so one of our next steps is to try to figure out why this zone of avoidance exists and whether it occurs around all red-giant stars."

The team used the Hobby-Eberly Telescope of McDonald Observatory in south-western Texas to make its discovery. Through the telescope, which is equipped with a precise spectrograph, the scientists observed a pattern of alternating shifts of spectral lines in the light coming from the star, which is located 1,200 light-years from the Earth in the constellation Leo. These tiny, alternating shifts represent the fingerprint of a star that is moving alternately toward and away from Earth as it wobbles in space responding to the gravitational pull of an orbiting planet. Because of the Doppler effect, the light from the star becomes bluer as it moves toward the Earth and then redder as it recedes from it, which is reflected by the measured shifts of the spectral lines. The specific pattern of these shifts, which the research team observed, allowed the scientists to determine that one planet -- and possibly two



planets -- orbit the star. If the second planet exists, the system would become the first multiplanet system discovered around a red-giant star.

Wolszczan said that he is particularly interested in applying to our own solar system the knowledge he gains about the effects of aging stars on planets orbiting other stars. "Our own Sun one day will become a red giant and it is interesting to think about what will happen to the outer planets of our solar system as the Sun expands," he said. "For example, Europa, one of Jupiter's moons, is covered by ice, but if it were to exist closer to the Sun, it might become a warm ocean world that could possibly support life."

Source: Penn State

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