

Jupiter-like planets could form around twin suns

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(PhysOrg.com) -- Life on a planet ruled by two suns might be a little complicated. Two sunrises, two sunsets. Twice the radiation field.

In a paper published in the December 2008 issue of *Astronomy and Astrophysics*, astronomer Joel Kastner and his team suggest that planets may easily form around certain types of twin (or “binary”) star systems. A disk of molecules discovered orbiting a pair of twin young suns in the constellation Sagittarius strongly suggests that many such binary systems also host planets.

“We think the molecular gas orbiting these two stars almost literally represents ‘smoking gun’ evidence of recent or possibly ongoing ‘giant’ (Jupiter-like) planet formation around the binary star system,” says Kastner, professor at Rochester Institute of Technology’s Chester F. Carlson Center for Imaging Science.

Kastner used the 30-meter radiotelescope operated by the Institut de Radio Astronomie Millimétrique (IRAM) to study radio molecular spectra emitted from the vicinity of the two stars in a binary system called V4046 Sgr, which lies about 210 light-years away from our solar system. (V4046 Sgr is the 4046th brightest variable-brightness star in the constellation Sagittarius.) The scientists found “in large abundance” raw materials for planet formation around the nearby stars, including circumstellar carbon monoxide and hydrogen cyanide, in the noxious molecular gas cloud.

The young stars, approximately 10 million years old, are close in proximity to each other—only 10 solar diameters apart—and orbit each other once every 2.5 days.

“In this case the stars are so close together, and the profile of the gas in terms of the types of molecules that are there is so much like the types of gaseous disks that we see around single stars, that it’s a real link between planets forming around single stars and planets forming around double stars,” Kastner says.

Planets that have just formed around young stars like the V4046 Sgr twins might leave leftover gas, a potential clue for astronomers who hunt planets.

Recently, direct imaging of planets orbiting the single stars Fomalhaut and HR 8799 irrefutably confirmed the existence of exosolar planets—those that orbit stars other than our Sun. In the spring, Kastner hopes to use IRAM to look for gas left over from the formation of the planets orbiting HR 8799.

Kastner hopes to compare the molecular profile in the gas remnants surrounding the single star (HR 8799) with the gas composition surrounding the dual star-system (V4046 Sgr).

Not a planet hunter himself, Kastner encourages other scientists to look closely at V4046 Sgr to see if planets are forming around them.

“We really don’t have any idea right now about what kinds of planets form around double stars or even if planets can form around double stars,” Kastner says. “It’s not something that’s established. It’s theoretically possible, but I’m not aware of a single observation yet of a planet orbiting a double star. I hope someone will go looking soon, if they haven’t already, around V4046 Sagittarius.”

Provided by Rochester Institute of Technology

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