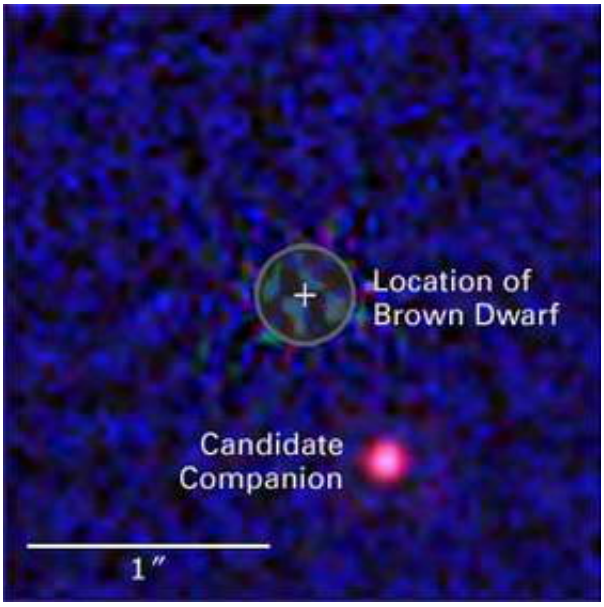
Hubble's Infrared Eyes Home in on Suspected Extrasolar Planet

January 10 2005



NASA's Hubble Space Telescope (HST) is providing important supporting evidence for the existence of a candidate planetary companion to a relatively bright young brown dwarf star located 225 light-years away in the southern constellation Hydra.

Astronomers at the European Southern Observatory's Very Large Telescope (VLT) in Chile detected the planet candidate in April 2004. They used infrared observations and adaptive optics to sharpen their

view. The VLT astronomers spotted a faint companion object to the brown dwarf star 2MASSWJ 1207334-393254 (also known as 2M1207). The object is a candidate planet, because it is only one-hundredth the brightness of the brown dwarf (at the longer-than-Hubble wavelengths observed with the VLT). It glimmers at barely 1800 degrees Fahrenheit, which is cooler than a light bulb filament.

Since an extrasolar planet has never been directly imaged, this remarkable observation required Hubble's unique abilities to do follow-up observations to test and validate if it is indeed a planet. Hubble's Near Infrared Camera and Multi-Object Spectrometer (NICMOS) camera conducted complementary observations taken at shorter infrared wavelength observations unobtainable from the ground. This wavelength coverage is important, because it is needed to characterize the object's physical nature.

Very high precision measurements of the relative position between the dwarf and companion were obtained with NICMOS in August 2004. The unique HST follow up observations were compared to the earlier VLT observations to determine if the two objects are really gravitationally bound and hence move across the sky together. Astronomers said they can almost rule out the probability the suspected planet is really a background object, since there was no noticeable change in its position relative to the dwarf.

If the two objects are gravitationally bound, they are at least 5 billion miles apart, about 30 percent farther apart than Pluto and the sun. Given the mass of 2M1207, inferred from its spectrum, the companion object would take a sluggish 2,500 years to complete one orbit. Any relative motion seen between the two on shorter time scales would reveal the candidate planet as a background interloper, not a gravitationally bound planet.

"The NICMOS photometry supports the conjecture the planet candidate is about five times the mass of Jupiter if it indeed orbits the brown dwarf," said Glenn Schneider of the University of Arizona, Tucson. "The NICMOS position measurements, relative to VLT's, indicate the object is a true (and thus orbiting) companion at a 99 percent level of confidence. Further planned Hubble observations are required to eliminate the one percent chance it is a coincidental background object, which is not orbiting the dwarf," he added.

The candidate planet and dwarf are in the nearby TW Hydrae association of young stars estimated to be less than 8 million years old. The HST NICMOS observations found the object to be extremely red and relatively much brighter at longer wavelengths. The colors match theoretical expectations for an approximately 8 million-year-old object that is about five times as massive as Jupiter. Further HST observations by the NICMOS team are planned in April 2005. The HST is a project of international cooperation between NASA and the European Space Agency.

Schneider is presenting these Hubble observations today at the meeting of the American Astronomical Society in San Diego, Calif.

Source: NASA