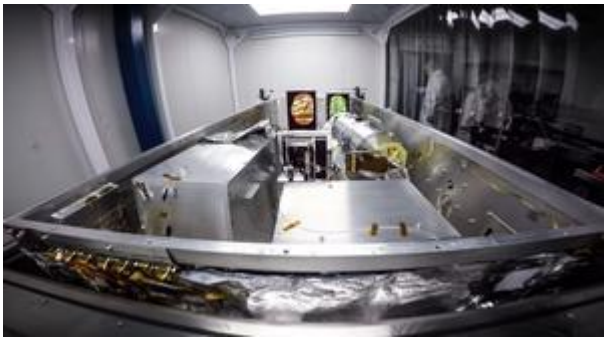
UCI astronomer and colleagues confirm existence of exoplanet orbiting nearby star

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The Habitable Zone Planet Finder spectrograph, shown here at Texas' Hobby-Eberly Telescope, helped astronomers to verify the existence of an exoplanet first detected by the Kepler spacecraft.

Picture Credit:
Gudmundur Stefansson / Pennsylvania State University

The team's findings were published recently in *The Astronomical Journal*. Called G 9-40b, the body is about twice the size of the Earth, slightly smaller than Neptune, and orbits a low-mass M dwarf star only 100 light years away. Kepler detected the planet by observing its transit across the star's front, with an expected dimming of light cast by the host. Through precise measurements of infrared signals, the sophisticated Habitable Zone Planet Finder – or HPF – spectrograph was able to accurately identify G 9-40b as an exoplanet, ruling out the possibility of a close stellar neighbor or binary companion to the dwarf star. High-contrast adaptive optics imaging observations using the ShARCS camera on the 3-meter C. Donald Shane telescope at California's Lick Observatory showed that the host star was the true source of the transits. "Kepler had outstanding measurement precision, but its spatial imaging resolution left open the possibility that the planet signal might be

coming from an unresolved nearby star," said Corey Beard, a UCI physics & astronomy graduate student who led the analysis of the adaptive optics data. He said the complementary roles of the various instruments involved enabled the team to confirm the existence of the exoplanet with high confidence. "The HPF's measurement precision for the smallest stars in the galaxy is really unprecedented," said Robertson, HPF project scientist and UCI assistant professor of physics & astronomy. "It opens up exciting new areas of exploration for planets orbiting these stars." He said his team hopes to further observe G 9-40b to gain an accurate measurement of its mass and determine whether it's a gas-rich planet like Neptune or a rocky planet like Earth or Mars. Installed at the 10-meter Hobby-Eberly Telescope at Texas' McDonald Observatory, HPF was designed to detect and characterize planets in the habitable zone – the region around a star where a planet could sustain liquid water on its surface – around M dwarfs, the most common stars in the Milky Way. For more information about this project, funded by the National Science Foundation, Pennsylvania State University and the Heising-Simons Foundation, see the HPF blog.

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