Planet with triple-star system found

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This artist's concept of HD 1885 Ab, the first known planet to reside in a triple-star system, would have a similar sunset to KELT-4Ab. Both systems host a pair of stars distantly orbiting the planet-hosting single sun. Credit: NASA/JPL-Caltech

A team of researchers working at the Harvard-Smithsonian Center for Astrophysics has announced the finding of a triple-star system—one that also as has a stable orbit planet in it. In their paper published in The *Astronomical Journal*, the team describes how they came to see that a binary system once thought to be a single star, was actually a pair of stars orbiting one another, and how that led to the revelation of the triple-star system.

Known planets with three stars appearing in their sky are rare, this new discovery is just the fourth, and it has caused excitement in the space community because it is the closest one yet, allowing for a better look than has been possible with the other finds. The main star is also brighter than the other stars that serve as suns for their planets, making it easier to study both the star and the planet.

The objects under study in the new system are KELT-4Ab, a gas giant planet, similar in size to Jupiter—it takes approximately three days to make its way around the star KELT-A, which serves as its sun. The other two stars, named KELT-B and C, are much farther away and orbit one another over the course of approximately 30 years. It takes the pair approximately four thousand years to orbit KELT-A. The researchers suggest that the view from KELT-4Ab would likely be one where its sun, KELT-A, would appear roughly forty times as big as our sun does to us due to its close proximity. The two other orbiting stars, on the other hand, would appear much dimmer due to their great distance, shining no brighter than our moon.

Space scientists have known of the existence of the KELT system for several years, but it was thought that the binary stars were actually just one star. The researchers on this new effort were able to see that they were actually a binary system courtesy of two robotically controlled telescopes on two different continents—one is in Arizona, the other in South Africa. Together they are known as the Kilodegree Extremely

Little Telescope (KELT), which is of course how the KELT system got its name.

The triple-star system offers a unique opportunity for scientists working to try to understand how it is that gas giants, such as KELT-4Ab, manage to orbit so close to their star. Theory suggests that they should be more distant, as is the case with Jupiter. One possibility, at least for this new discovery, is that it might have something to do with the nearby binary system.

More information: Jason D. Eastman et al, KELT-4Ab: An inflated hot Jupiter transiting the bright (~ 10) component of a hierarchical triple , *The Astronomical Journal* (2016). DOI: 10.3847/0004-6256/151/2/45