Transiting Exo-Planet Observed by the MHT

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SUMMARY

The Moses Holden Telescope has been used to detect a planet around another star – a so-called exo-planet. The detection method, of observing the planet as it transits its parent star, mimics the observations made by Jeremiah Horrocks himself, of Venus as it transited across the face of the Sun. This observation, in the year of the 375th anniversary of Horrocks' death, seems highly appropriate.

THE TRANSIT METHOD

The transit method involves observing the star while the planet is passing in front of it and blocking out some of the light. Then, if an accurate enough measurement is made, this can be compared to the brightness of the star after the planet has passed. Providing that the measurement has sufficient accuracy, the fraction of light obscured by the planet can be measured. The relative sizes of the star and the planet can then be calculated.

Figure 1: A picture of Venus, transiting across the face of the Sun. This was the type of observation made by Jeremiah Horrocks. *Image credit: HST – see: www.space.com/15552-hubble-space-telescope-venus-transit.html*

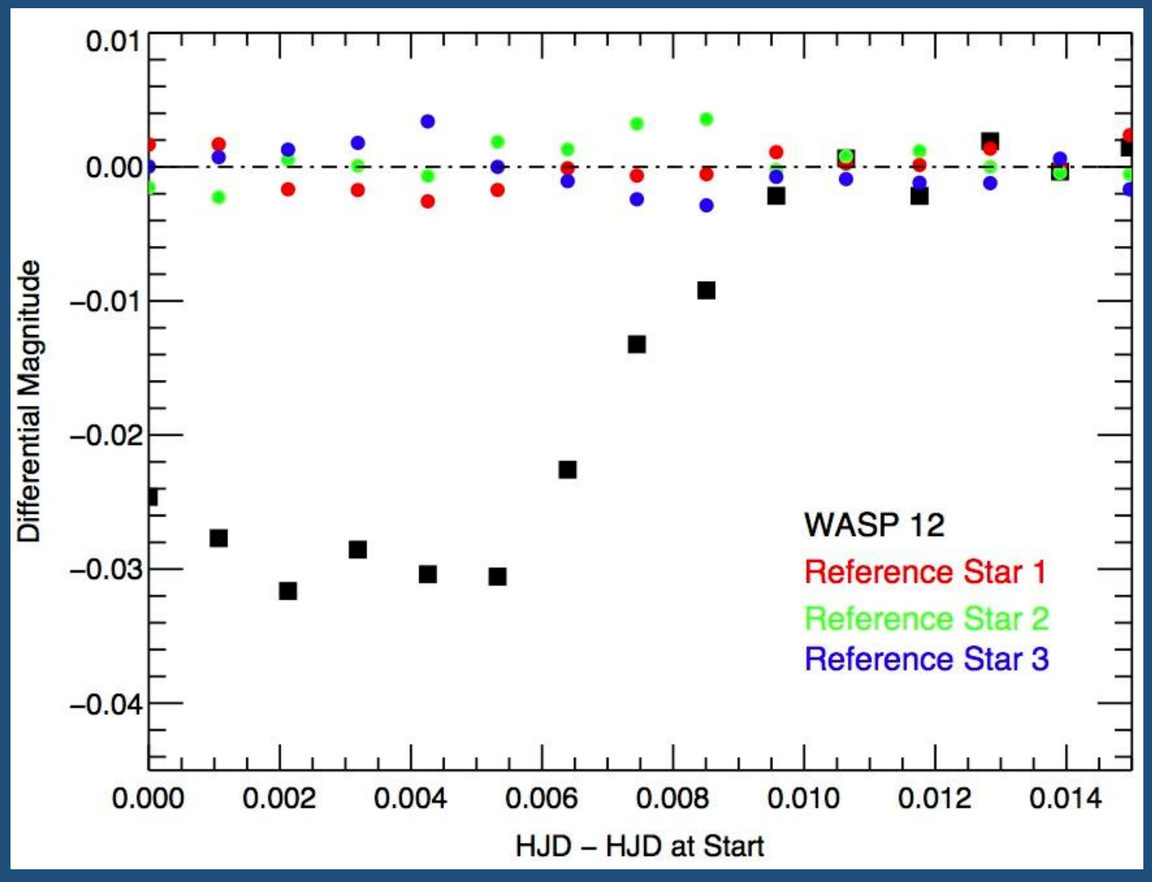

Figure 2: A series of very accurate measurements of the brightness of the star WASP-12 plotted on the y-axis, as function of time, plotted on the x-axis. These observations were made with the MHT. At the start of the observations the planet is in front of the star (in transit). As the planet passes away from being in front of the star, the star's brightness begins to increase, until eventually the planet is no longer in front of the star. The brightness of WASP-12 is normalised to the brightness of three other reference stars in the field of view. This work shows the incredible accuracy of measurements made possible by the MHT. *Image credit: Raeesa Parker, Mark Norris.*

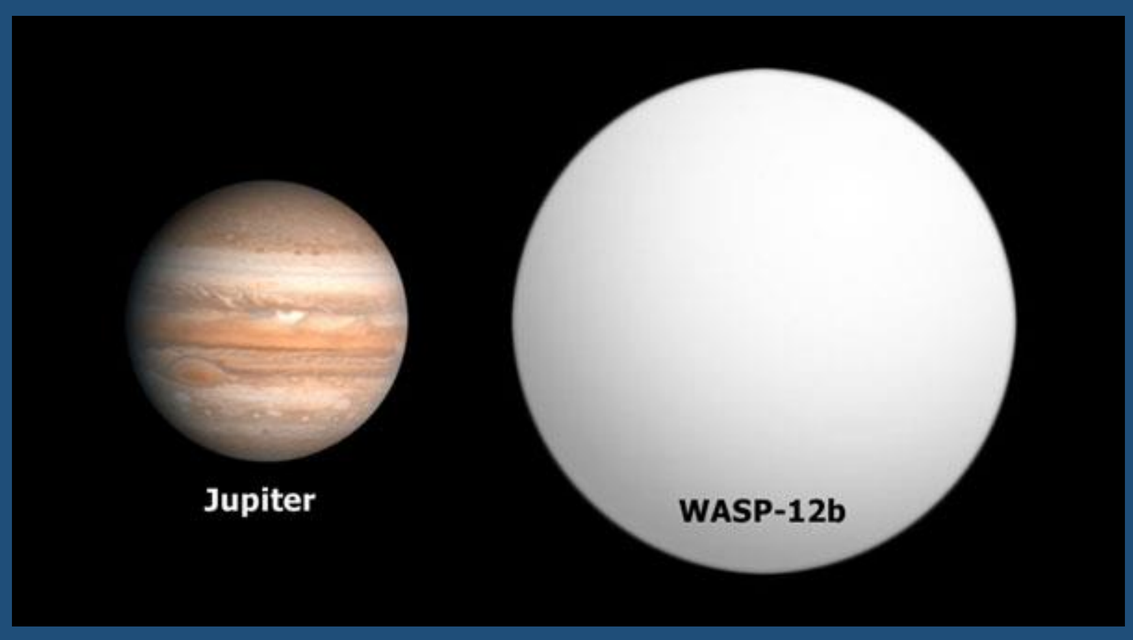

Figure 3: An artist's impression, showing the relative sizes of the planet around star WASP-12, compared to Jupiter. It has a radius 1.8 times bigger than that of Jupiter and a mass 1.4 times greater than that of Jupiter. Clearly, this must be a gas giant planet. Furthermore, its radius may have been inflated due to its proximity to the star heating its atmosphere and causing it to expand. *Image credit: Czech Astronomical Society. See: www.astro.cz/clanky/exoplanety*

Figure 4: An artist's impression of Jeremiah Horrocks observing the transit of Venus in 1639. The image is projected onto a screen to allow the Sun to be observed safely, since one must never look through a telescope at the Sun, which could result in severe eye damage. The painting is somewhat stylised, since nobody knows exactly what equipment Horrocks actually used. The transit occurred on November 24th 1639. *Painting by Eyre Crowe.*

References

Czech Astronomical Society - see:
http://www.astro.cz/clanky/exoplanety/
Hubble Space Telescope Archive – see:
http://www.space.com/15552-hubble-space-telescope-venus-transit.html
Painting by Eyre Crowe of Jeremiah Horrocks:
'The Founder of English Astronomy'.