STUDY OF TrES-3 Exoplanet

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● ABSTRACT

The first amateur observation of an exoplanet was made from the Nyrola Observatory in September 16, 2000. (Marko Moilanen, Jalo Ojanperä, Jouni Sorvari, Aki Id and Arto Oksanen). The jovian-type planet orbits a star that is 153 light years far away, and was called HD209458b in Pegasus. The equipment used by this Observatory was a 16 inches MEADE LX200, a ST7E CCD SBIG camera with a V photometric filter and an f/6.3 focal distance reducer. At the University of Nariño Observatory we have a similar equipment. The equipment we employed is: 14"LX200 GPS MEADE telescope and STL-1001 SBIG. The camera we used in our search is much more sensible than the one used by the Nyrola Observatory. From the Astronomical Observatory at the University of Nariño-COLOMBIA, we begun a systematic search for exoplanets. We have already confirmed the transit of the exoplanet TrES-3. This exoplanet was discovered by O'Donovan and other investigators, and turns around the GSC 03089-00929, with an orbital period of 1.30619 days (31.34856 hours) and inclination of 82.15 deg. The TrES-3 is quite interesting because it has one of the smallest periods found on exoplanets. Jessie L. Christiansen, et.al. observed seven transits and they found that the duration of transit is 81.9+/-1.1 minutes and inclination of 81.99+/-0.30 deg. We have captured a lot of data to elaborate the lightcurves so we can estimate the physical parameters of the exoplanet.

● EQUATIONS

$\Delta L \sim (R_P / R_S)^2$
ΔL = reduction of the luminosity star
R_P = radius of the planet disk
R_S = radius of the star disk

where:
e = eccentricity of the orbit
r = distance star-planet during transit
i = orbital inclination
$q = R_P / R_S$
$b = (r \cos i) / R_S$

$$t_T = \frac{T R_s \sqrt{(1+q)^2 - b^2}}{\pi a \sqrt{1-e^2}} \left(\frac{r}{a}\right)$$

● SUMMARY & CONCLUSIONS

We developed high precision photometry on several pictures. Analyses carried out with the best data lead to the following results: length of the transit = (80.8 +/- 3) minutes, depth of the transit = (0.025 +/- 0.001) magnitudes, and orbital period = (31.23 +/- 0.12) hours. Also we estimated the exoplanet radio = 88227.547 km and the semi-major axis of the orbit = 0.0225 UA.

TrES-3 in HERCULES
By: Alberto Quijano Vodniza, Mario Rojas & Karla Reyes
University of Narino Observatory - Colombia - August 05th 2008 (U.T)
HOUR (U.T)
MAGNITUDES
Duration of Transit = 80.8 minutes

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y = 0,0011x + 12,485