

Taurus Hill Observatory Exoplanet Observations

H. Haukka, V-P. Hentunen, M. Nissinen, T. Salmi, H. Aartolahti, J. Juutilainen and H. Vilokki
 Taurus Hill Observatory, Finland (harri.haukka@kassiopeia.net / Tel: +358-443406510)

Abstract

Taurus Hill Observatory (THO) [9], observatory code A95, is an amateur observatory located in Varkaus, Finland. The observatory is maintained by the local astronomical association of Warkauden Kassiopeia.

THO research team has observed and measured various stellar objects and phenomena. Observatory has mainly focused on asteroid [1] and in recent years more and more on exoplanet light curve measurements, observing the gamma rays burst, supernova discoveries and monitoring [2]. We also do long term monitoring projects [3]. THO research team has presented its research work on previous EPSC meetings ([4], [5], [6], [7], [8]) and got very supportive reactions from the European planetary science community.

In the early 2011 EU FP7 Europlanet NA1 and NA2 organized “*Coordinated Observations of Exoplanets from Ground and Space*”-workshop in Graz, Austria. The workshop gathered together pro-am astronomers who have the equipment to measure the light curves of the exoplanets. Also there were professional scientists working in the exoplanet field who attended to the workshop. The result of the workshop was to organize coordinated observation campaign for follow-up observations of exoplanets (e.g. CoRoT planets). Also coordinated observation campaign to observe stellar CME outbreaks was planned. THO has a lot of experience in field of exoplanet light curve measurements and therefore campaigns like this are very supported by the research team of the observatory. In next coming observing seasons THO will concentrate its efforts for this kind of campaigns.

The results and publications that pro-am based observatories, like THO, have contributed, clearly demonstrates that pro-amateurs are a significant resource for the professional astronomers now and even more in the future.

1. High Quality Measurements

The quality of the telescopes and CCD-cameras has significantly developed in 15 years. Today it is possible for pro-am's to make high quality measurements with the precision that is scientifically valid. In THO we can measure exoplanet transits < 10 millimagnitude precision when the limiting magnitude of the observed object is 15 magnitudes. At very good conditions it is possible to detect as low as 1 to 2 millimagnitude variations in the light curve.

2. Exoplanet Transit Observations in THO

THO team has made for some years transit and light curve measurements about the exoplanets. To this date the team has measured over 40 different exoplanet light curves, some of them several times. The first THO measurements have been added to AXA-database is maintained by Bruce L. Gary and now observatory is also using EDT (Exoplanet Transit Database) maintained by Variable Star and Exoplanet of Czech Astronomical Society (Figures 1 and 2).

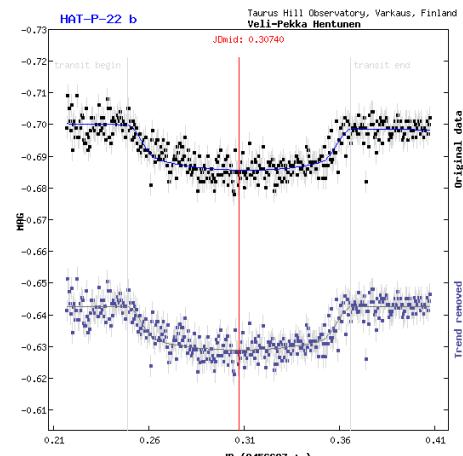


Figure 1: HAT-P-22 b (29.1.2014). THO / TRESCA.

THO site is optimal place in Finland to observe and measure transits and light curves during the winter due the lack of the light pollution. This gives the observatory possibility to have long measurement periods.

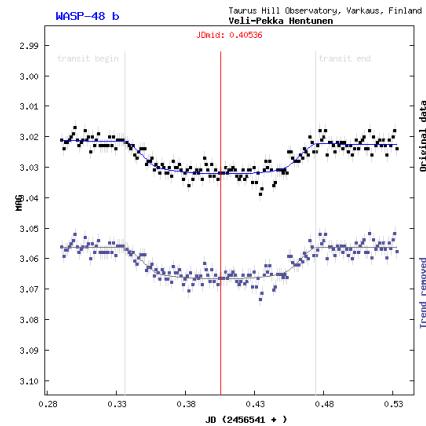


Figure 2: WASP-48 b (5.9.2013). THO / TRESCA.

3. Summary and Conclusions

Taurus Hill Observatory and other similar amateur based observatories have a good record in field of astronomy and especially in the light curve measurements and photometric monitoring.

The research teams have the knowledge for making a good and high quality photometric light curve measurements. The publication records are one of the good examples from this knowledge. In the future the THO research team aims for more challenging astronomical research projects with professional astronomers and observatories.

As a conclusion it can be stated that it is possible to do high quality astronomical research with amateur astronomy equipment if you just have the enthusiasm and knowledge to use your equipment in the right way.

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