

Exoplanet Observations in Taurus Hill Observatory - History and Current Activities

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Abstract

Taurus Hill Observatory (THO) [1], observatory code A95, is an amateur observatory located in Varkaus, Finland. The observatory is maintained by the local astronomical association Warkauden Kassiopeia. THO research team has observed and measured various stellar objects and phenomena. Observatory has mainly focused on exoplanet light curve measurements, observing the gamma rays burst, supernova discoveries and monitoring [2]. We also do long term monitoring projects [3].

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 20 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 research team has made for some years transit and light curve measurements about the exoplanets. To this date the team has measured over 60 different exoplanet light curves, some of them several times. The first THO measurements were added to AXA-database that was 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.

In Figure 1 below is one recent example of THO exoplanet measurements. Exoplanet HAT-P-13b was observed in THO 31.3./1.4.2018 19:50 – 00:44 (UTC). Despite the already quite light Finnish sky, the team managed the measure about 4 millimagnitude drop in transit light curve. The transit last, according to THO measurement, 196 minutes. Used telescope setting was: 16 inch Meade ACF, SBIG STT-8300M CCD camera and colour G filter.

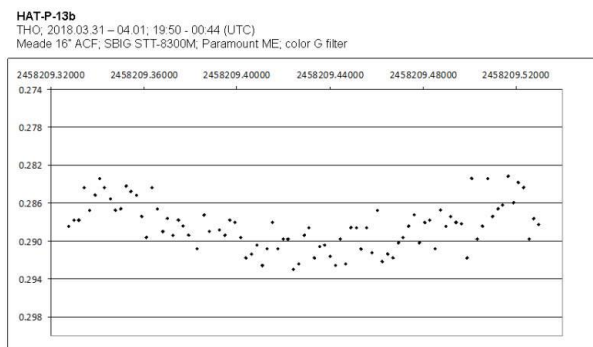


Figure 1: HAT-P-13b light curve 31.3./1.4.2018 19:50 – 00:44 (UTC).

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 (Figure 2). This gives the observatory possibility to have long measurement periods.



Figure 2: THO observatory site includes two (2) telescope buildings (two buildings on left) including overall 4 telescopes, control room (right) and large main building (not in this image).

3. Summary and Conclusions

Taurus Hill Observatory and other similar pro-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 pro-amateur astronomy equipment if you just have the enthusiasm and knowledge to use your equipment in the right way.

Acknowledgements

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References

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