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Pro-Amateur Observatories as a Significant Resource for Professional Astronomers – Taurus Hill Observatory

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Abstract

Taurus Hill Observatory (THO), observatory code A95, is an amateur observatory located in Varkaus, Finland. The observatory is maintained by the local astronomical association of Warkauden Kassiopeia [8].

THO research team has observed and measured various stellar objects and phenomena. Observatory has mainly focused on asteroid [1] and 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]) and got very supportive reactions from the European planetary science community.

The results and publications that pro-amateur 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-amateur astronomers to make high quality measurements with the precision that is scientifically valid. For example 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. As shown in figures 1 and 2 [9], the quality of the measurements today is as good as in many Earth based professional observatories less than 10 years ago.

2. Transit Observations in THO

Exoplanets have been one of the specialties of the THO research team. The team has made for some years transit and light curve measurements about the exoplanets. To this date the team has measured over 30 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 [9].

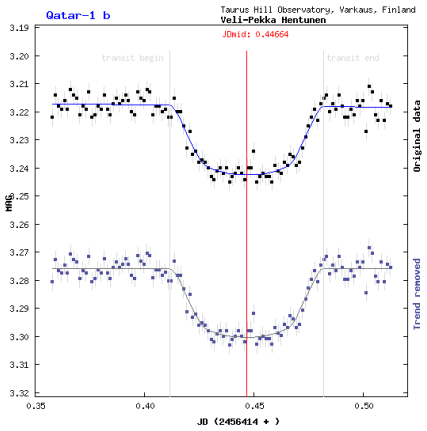

Figure 1: THO measurement from the exoplanet Qatar-1b (1.5.2013). Figure: THO / TRESCA.

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 during these dark winter months.

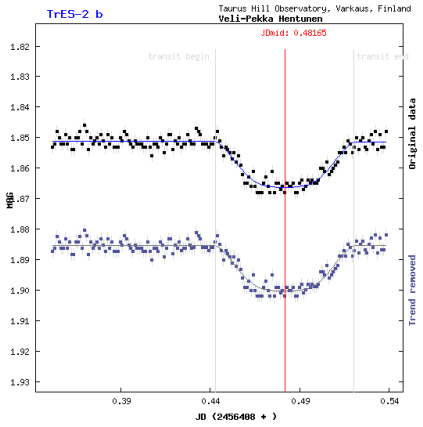

Figure 2: THO measurement from the exoplanet TrES-2b (25.4.2013). Figure: THO / TRESCA.

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 (e.g. THO research team) have possibility and 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.

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References

[1] Lightcurve inversion for asteroid spins and shapes; J. Torppa; University of Helsinki, Faculty of Science, Department of Astronomy; Doctoral dissertation; 2007

[2] A low-energy core-collapse supernova without a hydrogen envelope; S. Valenti, A. Pastorello, E. Cappellaro, S. Benetti, P. A. Mazzali, J. Manteca, S. Taubenberger, N. Elias-Rosa, R. Ferrando, A. Harutyunyan, V.-P. Hentunen, M. Nissinen, E. Pian, M. Turatto, L. Zampieri and S. J. Smartt; Nature 459, 674-677 (4 June 2009); Nature Publishing Group; 2009.

[3] A massive binary black-hole system in OJ 287 and a test of general relativity; M. J. Valtonen, H. J. Lehto, K. Nilsson, J. Heidt, L. O. Takalo, A. Sillanpää, C. Villforth, M. Kidger, G. Poyner, T. Pursimo, S. Zola, J.-H. Wu, X. Zhou, K. Sadakane, M. Drozdz, D. Koziel, D. Marchev, W. Ogloza, C. Porowski, M. Siwak, G. Stachowski, M. Winiarski, V.-P. Hentunen, M. Nissinen, A. Liakos & S. Dogru; Nature - Volume 452 Number 7189 pp781-912; Nature Publishing Group; 2008.

[4] Small Telescope Exoplanet Observations in Taurus Hill Observatory; V.-P. Hentunen, M. Nissinen, H. Haukka and H. Aartolahti; Vol. 4, EPSC2009-119, 2009; European Planetary Science Congress 2009

[5] Small telescope stellar object light curve measurements; H. Haukka, V.-P. Hentunen, M. Nissinen, T. Salmi, and H. Aartolahti; Vol. 5, EPSC2010-170, 2010; European Planetary Science Congress 2010

[6] Ground Based Support for Exoplanet Space Missions; H. Haukka, V-P. Hentunen, M. Nissinen, T. Salmi, H. Aartolahti, J. Juutilainen and H. Vilokki; Vol. 6, EPSC-DPS2011-683, 2011; EPSC-DPS Joint Meeting 2011

[7] Transit Observations in Taurus Hill Observatory; H. Haukka, V-P. Hentunen, M. Nissinen, T. Salmi, H. Aartolahti, J. Juutilainen and H. Vilokki; European Planetary Science Congress 2012; Vol. 7 EPSC2012-169 2012

[8] http://www.kassiopeia.net

[9] http://var2.astro.cz/EN/tresca/transits.php?pozor=Veli-Pekka+Hentunen