

## Ground Based Support for Exoplanet Space Missions

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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 Warkauden Kassiopeia.

THO research team has observed and measured various stellar objects and phenomena. Observatory has mainly focused to asteroid [1] and exoplanet light curve measurements, observing the gamma rays burst, supernova discoveries and monitoring [2] and long term monitoring projects [3].

In the early 2011 Europlanet NA1 and NA2 organized “Coordinated Observations of Exoplanets from Ground and Space”-workshop in Graz, Austria. The workshop gathered together proam 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 this campaign is very supported by the research team of the observatory. In next coming observing seasons THO will concentrate its efforts for this kind of campaigns.

### 1. Exoplanet light curve measurements

Exoplanets have been one of the specialties of the THO research team. The team has been made now some years light curve measurements about the exoplanets. To this date the team has measured 30 different exoplanet light curves and some of them many times. The first THO measurements have been added to AXA-database that is maintained by Bruce

L. Gary and now observatory is also using EDT (Exoplanet Transit Database) that is maintained by Variable Star and Exoplanet of Czech Astronomical Society. So far THO highlights in the exoplanet research are the measurements made from the GJ436b and HAT-P-13. THO research team presented its exoplanet and other research results in the EPSC 2009, Potsdam, Germany [4] and in EPSC 2010, Rome, Italy [5].

In result of the “Coordinated Observations of Exoplanets from Ground and Space”-workshop, the THO team has focused more to observe exoplanets and support space missions like CoRoT (see Figure 1). THO site is optimal place in Finland to observe and measure the light curves during the winter due the lack of the light pollution. This gives the observatory possibility to take long measurement periods during these dark winter months.

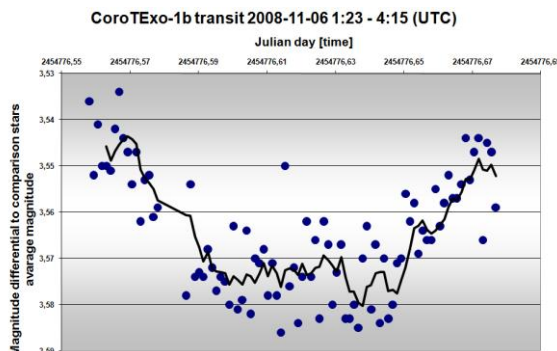


Figure 1: THO measurement from the exoplanet CoRoTExo-1b.

In the next years THO will support campaigns that can give new information to the scientific community and support the scientific research work especially in Europe. The campaign introduced above is a very good kick-off for the long lasting cooperation between THO and professional astronomers and institutes.

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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. Drozd, 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