Astronomy and Astrophysics in the Gaia sky
Proceedings IAU Symposium No. 330, 2017
A. Recio-Blanco, P. de Laverny, A.G.A. Brown & T. Prusti, eds.

doi:10.1017/S1743921317006317

Spectroscopic and Photometric Survey of Northern Sky for the ESA PLATO space mission

Renata Ženovienė, Vilius Bagdonas, Arnas Drazdauskas, Rimvydas Janulis, Lukas Klebonas, Šarūnas Mikolaitis, Erika Pakštienė, and Gražina Tautvaišienė

Institute of Theoretical Physics and Astronomy, Vilnius University, Saulėtekio al. 3, LT-10257, Vilnius, Lithuania
email: Sarunas.Mikolaitis@tfai.vu.lt

Abstract. The ESA-PLATO 2.0 mission will perform an in-depth analysis of the large part of the sky-sphere searching for extraterrestrial telluric-like planets. At the Molėtai Astronomical Observatory of Vilnius University, we started a spectroscopic and photometric survey of the northern sky fields that potentially will be targeted by the PLATO mission. We aim to contribute in developing the PLATO input catalogue by delivering a long-duration stellar variability information and a full spectroscopic characterization of brightest targets. First results of this survey are overviewed.

Keywords. Stars:abundances, stars:oscillations

1. Objectives

The main objective of the scientific preparation of the PLATO 2.0 mission (Ricker *et al.* 2015) is to create the most promising input catalogue of targets. The main source for the input catalogue will be the ESA-Gaia mission results. However, a supplementary material will be collected from other catalogues and on ground instruments. Majority of the large spectroscopic surveys, e. g. Gaia-ESO (Gilmore *et al.* 2012), RAVE (Steinmetz *et al.* 2006), are performed on large telescopes situated in the southern hemisphere and do not contain brightest objects in their star-lists. We estimated that only up to 30 % of necessary information from high-resolution spectroscopy is available for the brightest stars. Another issue is a lack of information on stellar variability that can perturb signals of photometric observations and that may cause the false-positive detections of planets in the PLATO mission.

Thus, our objective is to contribute in preparing a dataset of brightest targets of the most-northern regions of the sky-sphere for the northern PLATO 2.0 fields employing the spectroscopic and photometric instruments of the Molėtai Astronomical Observatory of ITPA VU, taking advantage of their northern geographical location.

2. Observations

We conduct spectroscopic and photometric observations using instruments of the Molėtai Astronomical Observatory of ITPA VU: (1) the high-resolution VUES spectrograph that covers a range of 400–880 nm with the resolving power R=60 000 (Jurgenson *et al.* 2016, *http://mao.tfai.vu.lt*) that is installed on the 1.65 m Cassegrain-type telescope and (2) the CCD photometer installed on the 35/51 cm wide field Maksutov-type telescope.

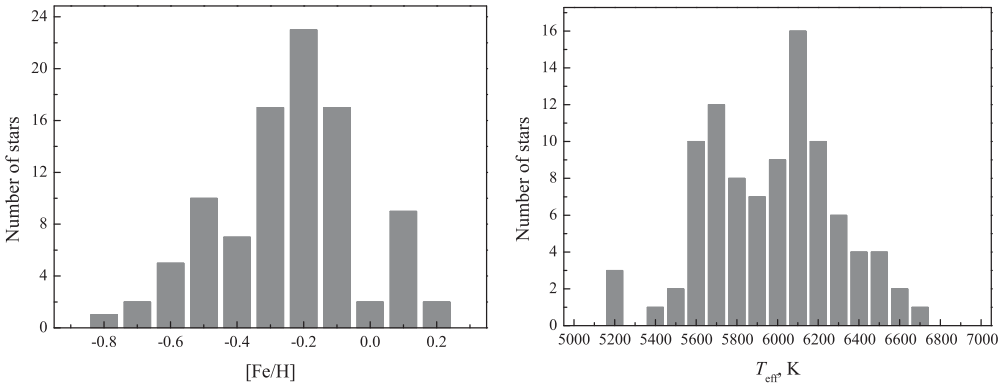

Figure 1. Metallicity (left) and effective temperature (right) distributions of sample stars.

Targets for the spectroscopic observations in the PLATO STEP02 field were selected from the Geneva-Copenhagen survey (Nordström *et al.* 2004) taking FGK-type dwarfs with V<8 mag. The photometric variability observations are going for stars with V<11 mag.

3. First results

We have already observed more than 200 stars spectroscopically and determined the main atmospheric parameters and chemical composition of iron group elements for about 130 stars with $v\sin i$<20 km s^{-1}. The study is done in accordance with the Gaia-ESO survey standards and techniques used by the Vilnius node (Smiljanic *et al.* 2014). In Fig. 1 we show the metallicity [Fe/H] and effective temperature $T_{\rm eff}$ distributions of sample stars.

The accomplished photometric observations already allowed us to discovered 20 previously unknown long-duration variables in several northern PLATO fields.

Using the information from spectroscopy and photometry, we will perform an in-depth analysis of the targets-of-interest. Results of this survey will be published in the upcoming papers by Mikolaitis *et al.* and Pakštienė *et al.* (in prep.).

Acknowledgements

This work was partly supported by the grant from the Research Council of Lithuania (LAT-16019).

References

Gilmore, G., Randich S., Asplund, M. *et al.* 2012, *The Messenger*, 147, 25

Jurgenson, C., Fischer, D., McCracken, T., Sawyer, D., Giguere, M., Szymkowiak, A., Santoro, F., & Muller, G. 2016, *Journal of Astronomical Instrumentation*, 5, id. 1650003-239

Nordström, B., Mayor, M., Andersen, J., Holmberg, J., Pont, F., Jorgensen, B. R., Olsen, E. H., Udry, S., & Mowlavi, N. 2004, *A&A*, 418, 989

Ricker, G. R., Winn, J. N., Vanderspek, R. *et al.* 2015, *Journal of Astronomical Telescopes, Instruments, and Systems*, 1, id. 014003

Smiljanic, R., Korn, A. J., Bergemann, M. *et al.* 2014, *A&A*, 570, A122

Steinmetz, M., Zwitter, T., Siebert, A. *et al.* 2006, *ApJ*, 132, 4

https://doi.org/10.1017/S1743921317006317 Published online by Cambridge University Press