

The GATE summer school

M. Skarka^{1,2}, J. Janík², E. Paunzen² and V. Glos²

¹ *Astronomical Institute of the Czech Academy of Sciences, Fričova 298,
CZ-251 65 Ondřejov, Czech Republic (E-mail: skarka@asu.cas.cz)*

² *Department of Theoretical Physics and Astrophysics, Masaryk University,
Kotlářská 2, CZ-611 37 Brno, Czech Republic*

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Abstract. The education activities in the form of short and condensed courses such as summer schools are essential parts of the educational process of every scientist. Here we briefly describe the program and the organization of the GATE summer school that was held in a form of virtual meeting between August 8 and 15 in Brno, Czech Republic.

Key words: GATE summer school – General: editorial – Methods: data analysis

1. Introduction

In the time of large sky surveys and projects producing large amount of data, it is very important to know where to find the archived and freely available data, how to work with them and what tools and pipelines to use to work efficiently. However, without the knowledge of the physics underlying the studied phenomena, working with the data would be useless. The two recent most important satellites regarding the stellar astrophysics are *GAIA* (Gaia Collaboration et al., 2018) and *TESS* (Ricker et al., 2014). Our motivation to organize a summer school dedicated to these two missions was to provide the students with knowledge about the usage of the data produced by these satellites in a short time of the summer school.

We named the school "*GAIA & TESS: Tools for understanding the Local Universe*", shortly *GATE summer school*¹. It was foreseen as the second summer school under the ERASMUS+ project titled "*Per Aspera ad Astra Simul*" that secures mobility of students, teachers and researchers among institutes in the Czech Republic, Slovak Republic, and Canarias, Spain (Kabáth et al., 2019). The first summer school was organized in cooperation with the OPTICON consortium and was held in Stará Lesná in Slovak Republic at the AI SAV between 17 and 27 July, 2019 (Kabáth et al., 2019).

¹<https://gate.physics.muni.cz/>

2. The organization of the school

The GATE summer school was organized by the Department of Theoretical Physics and Astrophysics, Masaryk university in Brno, Czech Republic (the main organizer) in cooperation with the Astronomical institute, AS CAS, Ondřejov, Czech Republic. Originally, the school was proposed for 30 students across the world working on six different topics in groups comprising five students under supervision of experienced scientists. The original date of the school (June 2020) had to be postponed to August due to the COVID-19 pandemic. This postponement resulted in the reduction to four projects due to the unavailability of tutors. In addition, 14 days before the start of the school, we were forced to go in a fully online regime because the in-person format was impossible to manage.

During July 2020, 20 students² from seven different countries were selected to participate on the school in the new dates of August 8 to 15. Finally, only 17 students of BSc to PhD stages were able to participate on the school. About 40 hours were dedicated to the work on four projects from the stellar astrophysics: Exoplanets (lead by Hannu Parviainen, IAC Tenerife, Spain), Stellar pulsations (lead by Paul Beck, University of Graz, Austria), Eclipsing binaries (lead by Kyle Conroy, Villanova University, United States) and Stellar flares (lead by Krisztian Vida, Konkoly Observatory, Hungary). The rest of the time was filled with lectures about the *TESS* and *GAIA* missions, as well as about *Kepler* (Borucki et al., 2010) and *BRITTE* satellites (Weiss et al., 2014). There were also two hands-on sessions on *TESS* and *GAIA* data and a career session.

All the communication and lectures were online using Zoom and Slack. After the initial get in use, these tools appeared to be very efficient and easy to use. The lectures were recorded and are available at Youtube.com³, the presentations are posted at the web page of the summer school. Despite the unpleasant situation, we managed to meet online at the conference party and have two hours of fun. The participants including the tutors are in Fig. 1.

3. The projects

The projects and the results are described in this CAOSP issue. Briefly, the exoplanet group revised the parameters of four transiting hot Jupiter planets by using *PyTransit* software (Parviainen, 2015) on the *TESS* data (Gajdoš et al., 2021). The binary group tested the robustness and accuracy of parameters using the soon to be released *PHOEBE 2.3* EB modeling package (Conroy et al., 2020) on the *TESS* data of AI Phe (Korth et al., 2021). Project on stellar flares was focused on search for flare stars in 136 open clusters by using *TESS* light curves and utilizing *GAIA* data (Maryeva et al., 2021). Finally, the asteroseismic group

²from 51 registered applicants

³https://www.youtube.com/channel/UChk-EY_tFtGKotKn9xt3PeA



Figure 1. The conference photo of all participants of the GATE summer school including the main organizer and tutors.

worked on the global asteroseismic analysis of a heart-beat star KIC 5006817 based on the full *Kepler* data sample and *TESS* data (Merc et al., 2021).

4. Summary

We briefly summarized the GATE summer school devoted to *TESS* and *GAIA* missions held in August 8-15 in Brno, Czech Republic. The school was held in fully online regime. The students attended six lectures focused on the space missions, two hands-on sessions focused on *TESS* and *GAIA* data, one career session, and participated on an online version of a conference party. The lectures are available online on the web page of the summer school and on Youtube.com. Overall, the students, tutors and lecturers did a great job. The results of the students projects are summarized in (Gajdoš et al., 2021; Maryeva et al., 2021; Korth et al., 2021; Merc et al., 2021, this proceedings).

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