**ASTRONOMICAL INSTITUTE**
**SLOVAK ACADEMY OF SCIENCES**

PROCEEDINGS OF THE WORKSHOP

# BINARY AND MULTIPLE STARS IN THE ERA OF BIG SKY SURVEYS

September 9 – 13, 2024, Litomyšl, Czech Republic

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Edited by

Theodor Pribulla, Miloslav Zejda

# BINARY AND MULTIPLE STARS IN THE ERA OF BIG SKY SURVEYS

September 9 – 13, 2024, Litomyšl, Czech Republic

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# PREFACE

This issue is fully dedicated to about seventy papers presented at the international conference Binary and Multiple Stars in the Era of Big Sky Surveys, which took place in September 2024 in the picturesque Czech historical town of Litomyšl, the birthplace of the composer Bedřich Smetana and the equally famous astrophysicist and mathematician Zdeněk Kopal. The five-day conference of the IAU symposia level, held by Department of Theoretical Physics and Astrophysics, Faculty of Science, Masaryk University in Brno; Astronomical Institute, Charles University, Prague; Astronomical Institute, Academy of Sciences of the Czech Republic, Ondřejov; and Town of Litomyšl from Czech Republic, and Astronomical Institute of Slovak Academy of Sciences, Slovak Republic, was attended by 143 astronomers from 25 countries on all continents except Africa and Antarctica. There were 130 oral talks on the conference program, 21 of which were invited (with e.g., H. Boffin, M. Brož, J. Budaj, P. Hadrava, D. Jones, U. Munari, A. Prša, A. Tkachenko, A. Skopal, A. Tokovinin, N. Werner, as speakers), and 28 posters, presented in a special Poster Session.

The chief leitmotif of the conference was the life of binary stars and multiple star systems, followed by modern instruments of big sky surveys. Most stars in our Universe live in binary and multiple systems. Understanding these objects is critical for practically all fields of astrophysics. A companion's presence significantly alters a star's evolution, resulting in many unusual objects, including type Ia supernovae, symbiotic stars, classical novae, or post-common-envelope

systems. Observations of the binary stars enable us to determine stars' masses, radii, and luminosities directly. These are necessary inputs for all models of stellar structure and evolution. Binary and multiple systems affect all galactic environments, including stellar associations and open and globular clusters.

The field of binary systems significantly benefits from numerous all-sky surveys and satellite missions, which are primarily focused on exoplanets or pulsating stars. The unprecedented precision of the satellite data revolutionized research of binary stars. Numerous fine effects are routinely observed and must be considered in the modeling. The continuous satellite photometry led to the detection of long-period eclipsing binaries and multiply-eclipsing multiple systems. The study of binaries also benefits from a simultaneous analysis of different types of observations, including radial velocities, line profiles, multi-color photometry, astrometry, or polarimetry. Despite substantial progress in the field, there are still many open questions. Those include the formation of close binaries and multiple systems, the common-envelope evolution, the magnetic dynamo, and activity in binary stars or stellar mergers.

The conference was the third of the specialized astrophysical conferences from 2004, 2014, and 2024, commemorating the legacy of the outstanding Czech astrophysicist, Zdeněk Kopal. Theodor Pribulla was the chairman of the SOC for the last (2024) conference. Together with Miloslav Zejda they are also the editors of this proceedings. The conference was very successful and inspiring, and in the final discussion, most participants expressed their wish to meet in the same format, but preferably in five years or sooner.

Zdeněk Mikulášek, Masaryk University in Brno, Czech Republic