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B. Wolf O. Stahl A. W. Fullerton (Eds.)

Variable and Non-spherical Stellar Winds in Luminous Hot Stars

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Variable and Non-spherical Stellar Winds in Luminous Hot Stars

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Held in Heidelberg, Germany, 15-19 June 1998

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Preface

Since the discovery of strong P Cygni-type profiles in their satellite-UV spectra more than 25 years ago, the mass loss of luminous hot stars by stellar winds has been a subject of considerable interest. This discovery not only changed our physical concept of the atmospheres of hot stars dramatically, but also had important consequences for the theory of the evolution of massive stars. The presence of winds from these stars influences many other astrophysical situations: in particular, they are an important source of chemically enriched material for the interstellar medium, and provide a substantial contribution to the interstellar energy budget. With large telescopes, individual luminous blue stars can be studied with high spectroscopic resolution, even in extragalactic systems. They are, therefore, important probes of the physical conditions in extragalactic systems of different Hubble types. Luminous blue stars have always been considered to be potentially important distance indicators.

Due to the importance of this ubiquitous mass loss, various IAU symposia (83, 116, 162, and 163) and IAU colloquia (59 and 113) have been held during the past twenty years, each of which emphasized different astrophysical aspects of the mass loss from hot stars.

Recently, however, there have been important discoveries and developments that have resulted in a new view of the properties of hot-star winds and the processes that affect them. Spectroscopic time series in the satellite UV (with IUE) and in ground-based wavelength ranges have shown that time variability is a general characteristic of the winds of luminous hot stars and that steady-state flows do not provide a good description of their observed properties. Rotation and pulsation most likely play an important role in triggering this variability, and some observational facts can be explained only by the presence of magnetic fields. Likewise much evidence has been accumulated that the winds are often non-spherical. In some spectacular cases the asymmetric outflows can be directly imaged with the HST. There have also been many new theoretical advances concerning pulsational effects and the formation of the disks observed around luminous hot stars.

These new results made it desirable to have an IAU colloquium that brought together the specialists in this field from all continents, to further develop the emergent concepts of wind variability and asphericity and to try to find answers to these most urgent questions, with the aim of developing a better physical understanding of the process of mass loss from hot stars and its evolutionary consequences.

There were several good reasons to hold IAU colloquium No. 169 on "Variable and Non-spherical Stellar Winds in Luminous Hot Stars" in Heidelberg during June 15 – 19, 1998. First and foremost is that these dates coincided

almost exactly with the hundredth anniversary of the inauguration of the Landessternwarte Königstuhl on June 20, 1898. The investigation of variable, luminous hot stars has a long tradition at the Landessternwarte Königstuhl. Indeed, the founder of the Landessternwarte – Max Wolf, one of the pioneers of using photographic plates for astronomy – discovered the LBV Var2 of M33 even before the extragalactic nature of this system was recognized. His first photographic plate of this object dates from October 1902. In 1998, LBVs and other variable luminous hot stars constituted one of the main fields of research at the Landessternwarte. Hence, the Landessternwarte's centennial also marks nearly 100 years of investigating variable luminous hot stars, which is further cause for celebration.

The colloquium was opened by the Oberbürgermeisterin of Heidelberg, Frau Beate Weber, who welcomed 150 participants from 30 countries. During the course of the meeting, 62 oral papers and approximately 70 poster papers were presented. The social program included a reception in the Max-Planck-Haus on June 14, a BBQ at the Landessternwarte Königstuhl in the evening of June 16, and a boat trip on the Neckar in the afternoon of June 18. A special problem during the colloquium was an influenza outbreak caused by the so-called "Heidelbug" which affected a number of participants. A proven remedy – beer – was distributed prophylacticly every evening after the last session and helped to limit the pain of the participants. A dive into the Neckar was also shown to be an effective way to kill the bug.

The scientific program of the colloquium was supported by Division IV and Commissions 25, 27, 28, 35, and 36 of the IAU. Financial support from the IAU and the German Research Council (DFG) is gratefully acknowledged.

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Heidelberg, December of 1998

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Session VI Evolutionary Aspects

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