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The Realm of Interacting Binary Stars

Active Close Binaries

Cataclysmic Variable Stars

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## **Evolutionary Processes in Interacting Binary Stars**

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between  
astronomy  
and  
geoscience in  
the context of  
applications,  
techniques  
and key  
principles of  
big data.  
Machine  
learning and  
parallel  
computing are  
increasingly  
becoming  
cross-

disciplinary as  
the  
phenomena of  
Big Data is  
becoming  
common  
place. This  
book provides  
insight into  
the common  
workflows and  
data science  
tools used for  
big data in  
astronomy  
and  
geoscience.  
After  
establishing  
similarity in  
data  
gathering,  
pre-processing  
and handling,  
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science  
aspects are  
illustrated in  
the context of

both fields. Software, hardware and algorithms of big data are addressed. Finally, the book offers insight into the emerging science which combines data and expertise from both fields in studying the effect of cosmos on the earth and its inhabitants. - Addresses both astronomy and geosciences in parallel, from a big data perspective - Includes introductory information, key principles,

applications and the latest techniques - Well-supported by computing and information science-oriented chapters to introduce the necessary knowledge in these fields

**The Observation and Analysis of Stellar Photospheres**

Springer Science & Business Media  
This dissertation describes work performed at the Palomar Testbed Interferometer

(PTI) during 1998-2002. Using PTI, we developed a method to measure stellar angular diameters in the 1-3 milli-arcsecond range with a precision of better than 5%. Such diameter measurements were used to measure the mass-radius relations of several lower main sequence stars and hence verify model predictions for these stars. In addition, by measuring the changes in Cepheid

angular diameters during the pulsational cycle and applying a Baade-Wesselink analysis we are able to derive the distances to two galactic Cepheids (h Aql & z Gem) with a precision of 10%; such distance determinations provide an independent calibration of the Cepheid period-luminosity relations that underpin current estimates of cosmic distance

scales. Second, we used PTI and the adaptive optics facility at the Keck Telescope on Mauna Kea to resolve the low mass binary systems BY Dra and GJ 569B, resulting in dynamical mass determinations for these systems. GJ 569B most likely contains at least one sub-stellar component, and as such represents the first dynamical mass determination of a brown dwarf. Finally,

a new observing technique, dual star phase referencing, was developed and demonstrated at PTI. Phase referencing allows interferometric observations of stars previously too faint to observe, and is a prerequisite for large-scale interferometric astrometry programs such as the one planned for the Keck Interferometer ; interferometric astrometry is a promising

technique for the study of extra-solar planetary systems, particularly ones with long-period planets.

High Precision Infra-Red Stellar Interferometry

Cambridge University Press  
IAU S240

focuses on recent advances across the broad field of binary star research.

*Knowledge Discovery in Big Data from Astronomy and Earth Observation*

Springer Science &

Business Media

This catalog of double stars is among the most comprehensive ever printed. With over 2,100 star pairings listed with coordinates, color, and interesting information about every pair, *Double Stars for Small Telescopes* is an essential addition to the library of every astronomy enthusiast.

248 pages, 8 1/2 x 11 inches, softcover.

**The Realm of Interacting**

**Binary Stars**

Elsevier

This document represents the third call for proposals for astronomical observations with the Hubble Space Telescope.

**Active Close Binaries**

Springer Science & Business Media

Focussing on the formulation of mathematical models for the light curves of eclipsing binary stars, and on the algorithms for generating such models, this book provides astronomers,

both amateur and professional, with a guide for - specifying an astrophysical model for a set of observations - selecting an algorithm to determine the parameters of the model - estimating the errors of the parameters. It is written for readers with knowledge of basic calculus and linear algebra; appendices cover mathematical details on such matters as optimisation, co-ordinate	systems, and specific models. While emphasising the physical and mathematical framework, the discussion remains close to the problems of actual implementation. The book concludes with chapters on specific models and approaches and the authors' views on the structure of future light-curve programs. <i>Cataclysmic Variable Stars</i> Springer Science & Business	Media Third edition textbook for use on advanced courses on stellar physics. <i>Astronomy and Cosmogony</i> Cambridge University Press The formative ideas for this symposium originated in 1978 at the IAU Symposium No. 83 on "Mass Loss and Evolution of O-type Stars" held at Qualicum Beach, Vancouver Island, Canada - WR stars generally
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figure prominently in O-star meetings and vice versa! Following general approval by the IAU Executive Committee the initial ideas were cemented at a subsequent meeting, IAU Colloquium No. 59 on "The Effects of Mass Loss on Stellar Evolution", held at Miramare, Trieste, Italy in 1980, which was attended by the majority of the present Scientific Organising Committee

and at which meeting the outline programme for this symposium was formulated. 1981 was considered an appropriate year in which to hold a meeting on WR stars, since the last IAU Symposium devoted to this stellar class had been held a decade earlier, in Buenos Aires (IAU Symposium No. 49), and during this intervening period a wealth of new

observational material had been obtained for WR stars together with significant advances on the theoretical front. The venue for this symposium was chosen from the requirement, which can be inferred from the above, that a meeting on 'hot' stars take place in an appropriate, sunny climate and followed upon the excellent suggestion of Dr. C. Firmani to hold the symposium in Mexico. *Publications*



Springer Science & Business Media Binary systems of stars are as common as single stars. They are of fundamental importance because they allow stellar masses, radii and luminosities to be measured directly, and explain a host of diverse and energetic phenomena including X-ray binaries, cataclysmic variables, novae, symbiotic stars, and some types of supernovae.

This 2001 book was the first to provide a pedagogical and comprehensive introduction to binary stars. It combines theory and observations at all wavelengths to develop a unified understanding of binaries of all categories. It comprehensively reviews methods for calculating orbits, the Roche model, ideas about mass exchange and loss, methods for analysing light curves,

the masses and dimensions of different binary systems, and imaging the surfaces of stars and accretion structures. This book provides a thorough introduction to the subject for advanced undergraduate and graduate students. Researchers will also find this to be an authoritative reference.

**Third Asian-Pacific Regional Meeting of the International**

**Astronomical  
Union**

John Wiley & Sons  
Since the 1970s symposia or colloquia devoted to recent research on close binaries have been held around the world almost annually. At meetings of the General Assembly of the International Astronomical Union this topic has also been discussed in detail at presentations in various commission meetings and also as invited

talks by leading astronomers in the field. In recent years, fundamental changes have taken place in the study of close binaries due to the improvements in observational techniques, extension of observations from X-ray to radio regions of the electromagnetic spectrum, and advances in theoretical studies. For more than a decade, a group of astronomers at Ege University Observatory

has been concentrating on active close binaries with particular emphasis on the behaviour of the light curves of chromospherically active systems. Thus, we decided to organize an international meeting in Western Anatolia, where this part of Turkey had been the cradle for great developments in science during antiquity. KUljadasi, located only minutes away from Ephesus,

one of the seven wonders of the world, was selected to be the meeting site. Close binary systems constitute a very rich source of information about the physical properties of the component stars. Some systems are eclipsing variables, where periodic recurrences of eclipses are observed as comparatively brief decreases in the total brightness of the binary system. Precise methods of photometric observations make it possible to obtain the light variations of these systems because of eclipses and other phenomena. Science with the VLT Interferometer CRC Press "Observing Visual Double Stars, " written by an astronomer who has discovered almost 2,000 of them, opens the way to amateur astronomers who wish to make a direct and real contribution to science through their avocation. Double or binary stars--pairs of stars that revolve around one another--were once thought to be rare, anomalies among the vast number of normal, isolated stars, like our sun. Now, however, it is believed that many if not "most" stars are mated in binary systems. The visual binaries are those whose component

stars are rather distant from each other and require decades or even centuries to complete their orbits. Few professional astronomers devote their time to making the observations needed, over these extended periods, to determine the characteristics of even a small sample of these systems. Thus, if any sizable number of double stars are to be closely

scrutinized, their periodic variations plotted, and their orbits and masses calculated, the host of amateur astronomers will have to come to the aid of the professionals by making patient, systematic, night-after-night, year-after-year recorded observations." Observing Visual Double Stars" is designed to train amateurs to become such lookouts. After a historical account of the

discovery of binaries (from the sighting of the first in 1650, through the work of the Herschels and the Struves in the eighteenth and nineteenth centuries, to the present), the author describes the various classes of telescopes and other instruments and the relevant optical principles. This is followed by practical advice on how to use this apparatus to identify

double stars and measure their variations over time. The heart of the book--and its technically most advanced section--presents the mathematical techniques that will allow the observer to calculate orbits and masses from the variables that have been measured. A chapter entitled "Voyage to the Country of Double Stars" describes a binary system as it might appear to an

observer within it. The book also explains the use of star catalogues and presents its own catalogue of 744 double stars accessible to the amateur observer.

**Publications of the Astronomical Society of the Pacific**

Springer Science & Business Media  
It has always been ESO's aim to operate the VLT in an interferometric mode (VLTI) which allows the coherent combination

of stellar light beams collected by the four 8-m telescopes and by several smaller auxiliary telescopes. In December 1993, in response to financial difficulties, the ESO Council decided to postpone implementation of the VLTI, Coude trains and associated adaptive optics for all the UTs but included provisions for continuing technological and development programmes

devoted to the aim of reintroducing these capabilities at the earliest possible date. The desirability of carrying out the full VLTI programme as originally envisaged at the earliest possible moment has not, however, diminished, especially in view of VLTI's exceptional capabilities and resulting potential for new and exciting discoveries. In recent years, interferometric projects have begun to

play a central role in ground-based high-resolution astronomy, and numerous instruments have been completed or are in the process of construction. Several large-aperture interferometers will probably come on-line near the turn of the century. The impending presence of these new instruments represents an important incentive both for clarifying the scientific cases for various VLTI implementations

in plans and for ensuring VLTI's competitiveness in the international context over the next 10~20 years.

### **Astronomy and Cosmogony**

Springer Science & Business Media  
An advanced review of how binary stars affect stellar evolution, presenting results from state-of-the-art models and recent observations.  
Strongly Coupled Plasma Physics  
Springer

Science & Business Media More than half of all stars in the universe formed and evolved as binary systems and their study is essential for understanding stellar and galactic evolution. The six lectures in this book give both a readable introduction and an up-to-date review of nearly all aspects of research into binary stars, including the range from common binaries to more exotic systems composed of white dwarfs, neutron stars and black holes.

*Binary Stars: Selected Topics on Observations and Physical Processes* Cambridge University Press

This timely volume provides the first comprehensive survey of cataclysmic variable stars, integrating theory and observation into a single, synthesised text.

An Introduction to Close Binary Stars Springer Science & Business Media

Astronomers learn much of what they know about the mass, brightness, and size of stars by observing binary systems, in which two stars orbit each other, periodically cutting off the others light. This book provides astronomers with a guide to specifying an astrophysical model for a set of observations, selecting an

algorithm to determine the parameters of the model, and estimating the errors of the parameters. *Expansive Classification* Springer Science & Business Media Astronomy and Astrophysics Abstracts aims to present a comprehensive documentation of the literature concerning all aspects of astronomy, astrophysics, and their border fields. It is devoted to the recording,

summarizing, and indexing of the relevant publications throughout the world. Astronomy and Astrophysics Abstracts is prepared by a special department of the Astronomische Rechen-Institut under the auspices of the International Astronomical Union. Volume 44 records literature published in 1987 and received before February 15, 1988. Some older documents

which we received late and which are not surveyed in earlier volumes are included too. We acknowledge with thanks contributions of our colleagues all over the world. We also express our gratitude to all organizations, observatories, and publishers which provide us with complimentary copies of their publications. Dr. Siegfried Böhme retired from his duties as co-editor of Astronomy



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and became  
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and  
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1975 he took  
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particularly,  
the Russian  
literature on a  
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basis for 12

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Böhme for his  
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that a binary  
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responsible for  
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has led to the  
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that textbooks  
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need to be  
rewritten.  
Building upon  
the review of  
Jones and  
Boffin in  
Nature  
Astronomy

(2017), this Springer Brief takes a first step in this direction. It offers the first expanded presentation of all the theoretical and observational support for the importance of binarity in the formation of planetary nebulae, initially focusing on common envelope evolution but also covering wider binaries. This book emphasises the wider impact of the field, highlighting

the critical role binary central stars of planetary nebulae have in understanding a plethora of astrophysical phenomena, including type Ia supernovae, chemically peculiar stars and circumbinary exoplanets. Encyclopedia of Astronomy & Astrophysics MIT Press (MA) Founded in 1911, the AAVSO boasts over 1200 members and observers and is the world's largest non-profit organization

dedicated to variable star observation. This timely book marks the AAVSO's centennial year, presenting an authoritative and accurate history of this important association. Writing in an engaging and accessible style, the authors move chronologically through five eras of the AAVSO, discussing the evolution of its structure and purpose. Throughout the text, the main focus is on the thousands of

individuals whose contributions have made the AAVSO's progress possible. Describing a century of interaction between amateur and professional	astronomers, the authors celebrate the collaborative relationships that have existed over the years. As the definitive history of the first hundred years of the	AAVSO, this text has broad appeal and will be of interest to amateur and professional astronomers, as well as historians and sociologists of science in general.
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