

Stephen F. Tonkin (Ed.)

PRACTICAL AMATEUR SPECTROSCOPY



Practical Amateur Spectroscopy

Keith Robinson



Practical Amateur Spectroscopy:

Practical Amateur Spectroscopy Stephen F. Tonkin, 2013-11-11 This book contains everything an amateur astronomer needs to know to begin observing whilst going relatively deeply into the subject for those who are already involved Covers a very wide range of available equipment from simple DIY spectrometers to the most expensive commercially made instruments Describes basic principles so that the reader understands how to analyse the spectra he she sees or records Contributions by leading amateurs astronomers from the USA and Europe

Spectroscopy: The Key to the Stars Keith Robinson, 2007-08-15 While most amateur astronomers know about the red shift have a general idea of the way that the emission and absorption lines in stellar spectra provide an insight into the atomic processes of the star it is unusual to find someone who has any kind of detailed knowledge The reason isn't lack of interest far from it but is because all the books currently available are pitched at professional astronomers and degree students and are to say the least difficult to read This is the first non technical book on this subject written specifically for practical amateur astronomers It includes all the science necessary for a qualitative understanding of stellar spectra but avoids a mathematical treatment which would alienate many of its intended readers Any amateur astronomer who carries out or who is interested in observational spectroscopy and who wants a non technical account of the physical processes which determine the intensity and profile morphology of lines in stellar spectra will find this is the only book written specially for him And of course armchair astronomers who simply want to understand the physical processes which shape lines in stellar spectra will find this book equally fascinating

Spectroscopy: The Key to the Stars Keith Robinson, 2007-01-16 This is the first non technical book on spectroscopy written specifically for practical amateur astronomers It includes all the science necessary for a qualitative understanding of stellar spectra but avoids a mathematical treatment which would alienate many of its intended readers Any amateur astronomer who carries out observational spectroscopy and who wants a non technical account of the physical processes which determine the intensity and profile morphology of lines in stellar spectra will find this is the only book written specially for them It is an ideal companion to existing books on observational amateur astronomical spectroscopy

Astronomical Spectroscopy for Amateurs Ken M. Harrison, 2011-02-07 *Astronomical Spectroscopy for Amateurs* is a complete guide for amateur astronomers who are looking for a new challenge After a brief overview of the development of spectrometers and an introduction to the theory of stellar spectra the book goes on to examine the various types of spectrometers available to amateurs Next practical sections address all aspects of setting up and using various types of commercially available and home built spectrometers A final part gives detailed instructions for the design and construction of three different spectrometers along with the necessary design theory minimal math The home made spectrometers have performance capabilities near or equal to commercial units but are constructed using basic hand tools for a fraction of the cost This up to date practical spectroscopy book will enable amateur astronomers to develop the skills and equipment needed to prepare

scientifically acceptable spectra data and to make a valuable contribution to ProAm projects

Using Commercial Amateur Astronomical Spectrographs Jeffrey L. Hopkins, 2013-11-19 Amateur astronomers interested in learning more about astronomical spectroscopy now have the guide they need. It provides detailed information about how to get started inexpensively with low resolution spectroscopy and then how to move on to more advanced high resolution spectroscopy. Uniquely the instructions concentrate very much on the practical aspects of using commercially available spectroscopes rather than simply explaining how spectroscopes work. The book includes a clear explanation of the laboratory theory behind astronomical spectrographs and goes on to extensively cover the practical application of astronomical spectroscopy in detail. Four popular and reasonably priced commercially available diffraction grating spectrographs are used as examples. The first is a low resolution transmission diffraction grating the Star Analyser spectrograph. The second is an inexpensive fiber optic coupled bench spectrograph that can be used to learn more about spectroscopy. The third is a newcomer the ALPY 600 spectrograph. The fourth spectrograph considered is at the other end of the market both in performance and cost the high resolution Lhires III. While considerably more expensive this is a popular and excellent scientific instrument that allows more advanced amateur astronomers to produce scientifically valuable data. With all of these tools in place the amateur astronomer is well prepared to forger deeper into the night sky using spectroscopy.

The Practical Astronomer's Deep-sky Companion Jess K. Gilmour, 2003 The Practical Astronomer's Deep sky Companion is an essential item of equipment for deep sky observers whether they are interested in imaging or just sightseeing. This large format full colour book is designed to be taken out into the field during observing to provide essential detailed concentrated information for finding and imaging interesting deep sky objects. Organised by constellation each spread features the most interesting objects with images, information, position locator maps, recommended exposure times for telescopes of various apertures and much more.

Spectroscopy for Amateur Astronomers Marc F. M. Trypsteen, Richard Walker, 2017-07-20 This accessible guide presents the astrophysical concepts behind astronomical spectroscopy covering both the theory and the practical elements of recording, processing, analysing and interpreting your spectra. It covers astronomical objects such as stars, planets, nebulae, novae, supernovae and events such as eclipses and comet passages. Suitable for anyone with only a little background knowledge and access to amateur level equipment, the guide's many illustrations, sketches and figures will help you understand and practise this scientifically important and growing field of amateur astronomy up to the level of Pro Am collaborations. Accessible to non academics it benefits many groups from novices and learners in astronomy clubs to advanced students and teachers of astrophysics. This volume is the perfect companion to the Spectral Atlas for Amateur Astronomers which provides detailed commented spectral profiles of more than 100 astronomical objects.

Amateur Telescope Making Stephen Tonkin, 2012-12-06 Many amateur astronomers make their own instruments either because of financial considerations or because they are just interested. Amateur Telescope Making offers a variety of designs for

telescopes mounts and drives which are suitable for the home constructor The designs range from simple to advanced but all are within the range of a moderately well equipped home workshop The book not only tells the reader what he can construct but also what it is sensible to construct given what time is available commercially Thus each chapter begins with reasons for undertaking the project then looks at theoretical consideration before finishing with practical instructions and advice An indication is given as to the skills required for the various projects Appendices list reputable sources of mail order materials and components The telescopes and mounts range from shoestring very cheap instruments to specialist devices that are unavailable commercially

The New Amateur Astronomer Martin Mobberley, 2012-12-06 Amateur astronomy has changed beyond recognition in less than two decades The reason is of course technology Affordable high quality telescopes computer controlled go to mountings autoguiders CCD cameras video and as always computers and the Internet are just a few of the advances that have revolutionized astronomy for the twenty first century Martin Mobberley first looks at the basics before going into an in depth study of what is available commercially He then moves on to the revolutionary possibilities that are open to amateurs from imaging through spectroscopy and photometry to patrolling for near earth objects the search for comets and asteroids that may come close to or even hit the earth The New Amateur Astronomer is a road map of the new astronomy equally suitable for newcomers who want an introduction or old hands who need to keep abreast of innovations From the reviews This is one of several dozen books in Patrick Moore's Practical Astronomy series Amid this large family Mobberley finds his niche the beginning high tech amateur The book's first half discusses equipment computer driven telescopes CCD cameras imaging processing software etc This market is changing every bit as rapidly as the computer world so these details will be current for only a year or two The rest of the book offers an overview of scientific projects that serious amateurs are carrying out these days Throughout basic formulas and technical terms are provided as needed without formal derivations An appendix with useful references and Web sites is also included Readers will need more than this book if they are considering a plunge into high tech amateur astronomy but it certainly will whet their appetites Mobberley's most valuable advice will save the book's owner many times its cover price buy a quality telescope from a reputable dealer and install it in a simple shelter so it can be used with as little set up time as possible A poor purchase choice and the hassle of setting up are why most fancy telescopes gather dust in their owners dens

Summing Up Highly recommended General readers lower and upper division undergraduates T D Oswalt CHOICE March 2005

How to Observe the Sun Safely Lee Macdonald, 2012-12-06 The Sun is the brightest and most accessible object in the sky and it has much to offer the amateur astronomer with modest equipment On most days it shows sunspots and other features that display a wealth of fine detail and change their appearance strikingly from day to day But observing the Sun can be dangerous NEVER look at the Sun through a telescope or other optical aid even for a brief instant The Sun's intense radiation amplified and focused by a telescope will almost certainly cause eye injury and could well lead to complete blindness Do not attempt any solar observing

until you have read and understood the safety precautions and observing advice set out in Chapter 2 of this book even if you think you have the correct equipment Be especially wary about using filters to observe the Sun If you have a filter that makes the Sun look dark it is not necessarily safe as it is largely the Sun's invisible radiation that is harmful to the eye But provided you use the correct techniques such as projecting the solar image onto a screen or using a specially designed quality solar filter that fits over the telescope aperture it is quite easy to observe the Sun safely More Small Astronomical Observatories Patrick Moore, 2012-12-06 Almost every serious amateur astronomer knows the benefit of having a fixed observatory of some sort it saves a vast amount of time and effort during every observing session and this book provides the necessary help More Small Astronomical Observatories details the methods and techniques employed by non professional astronomers from all over the world providing a wonderful resource for anyone wishing to build a small observatory of almost any kind It's a fun read too **Imaging Sunlight Using a Digital Spectroheliograph** Ken M. Harrison, 2016-05-24 Ken M Harrison's latest book is a complete guide for amateur astronomers who want to obtain detailed narrowband images of the Sun using a digital spectroheliograph SHG The SHG allows the safe imaging of the Sun without the expense of commercial etalon solar filters As the supporting software continues to be refined the use of the digital spectroheliograph will become more and more mainstream and has the potential to replace the expensive solar filters currently in use The early chapters briefly explain the concept of the SHG and how it can produce an image from the solar spectrum A comparison of the currently available narrow band solar filters is followed by a detailed analysis of the critical design construction and assembly features of the SHG The design and optimum layout of the instrument is discussed to allow evaluation of performance This information explains how to assemble a fully functional SHG using readily available components The software required to process the images is explained and step by step examples provided with various digital instruments around the world highlighted based on input from many experienced amateurs who have shared their experience in building and using their spectroheliographs The final chapters provide a historical overview of the traditional spectroheliograph and the later spectrohelioscope from the initial G E Hale and Deslandres concepts of the 1890's through to the later work by Veio and others The construction and performance of various instruments is covered in detail and provides a unique opportunity to record and appreciate the groundbreaking researches carried out by amateurs in the 20th century This is an absolutely up to date book which fully addresses the watershed game changing influence of the digital imaging revolution on the traditional spectroheliograph *A Spectroscopic Atlas of Bright Stars* Jack Martin, 2009-11-11 *A Spectroscopic Atlas of the Stars A Pocket Field Guide* is a standard reference book for all amateur astronomers interested in practical spectroscopy or spectrography For the first time in one place it identifies more than 70 northern hemisphere bright stars that are suitable observational targets for both amateurs and astronomy students Finder charts are provided for locating these sometimes familiar stars Data for each star includes labelled stellar spectra a spectral profile with spectral lines identified These are

conveniently laid out on a single page opposite tables of spectroscopic properties and lines and wavelengths identified This is the first Spectral Atlas designed for amateur astronomers It is equally relevant to college undergraduates being intended to familiarize astronomers of any age and level of knowledge with labelled stellar spectra and their different properties It contains much information about stars which is hard to find or inaccessible to most people *The Observer's Year* Patrick Moore,2006-03-30 For this new edition the text has been brought fully up to date and the period covered is from 2005 to 2010 Inevitably this has meant that large sections of the book have been completely rewritten Much has happened since the first edition was published in 1998 Patrick Moore December 2004 v 00 OY2e_PRE i xvi qxd 14 2 05 2 03 PM Page vii Contents Preface v Introduction ix Phases of the Moon 2005 2010 xii January 1 February 39 March 67 April 97 May 127 June 155 July 181 August 209 September 237 October 265 November 295 December 325 Appendix A The 88 Constellations 351 Appendix B Glossary 353 Appendix C The Greek Alphabet 363 Index 365 vii 00 OY2e_PRE i xvi qxd 14 2 05 2 03 PM Page ix

Introduction It was once said that the night sky always looks much the same In fact nothing could be further from the truth There are 365 days in each year 366 in a Leap Year and from an astronomical point of view no two are alike Observing Variable Stars Gerry A. Good,2012-12-06 Observing variable stars is one of the major contributions amateur astronomers make to science There are 36 000 variable stars listed in the General Catalogue of Variable Stars so it is clearly impossible for the limited number of professional observatories to target even the majority of them That's where amateur astronomers come in thousands of them turning their telescopes to the sky every night Variable star observing is the most popular of real science activities for amateurs and Gerry Good's book provides everything needed The first part of the book provides a highly detailed account of the various classes of variable star with examples illustrations and physical descriptions The second section covers practical aspects of observing everything from preparation and planning through observing techniques to data management and reduction Observer's Guide to Stellar Evolution Mike Inglis,2012-12-06 Stellar evolution the birth development and death of stars is central to our current understanding of astronomy but surprisingly the majority of amateur astronomers lack a full understanding of the physics of stars Current books on the market tend to be highly theoretical and off putting in *Observer's Guide to Stellar Evolution* Mike Inglis brings this subject to life in a unique way By combining a step by step introduction with suggestions for practical observations of stars at different stages in their evolution amateur astronomers regardless of their current level of knowledge will find this book fascinating and informative Accessible to every amateur astronomer regardless of background knowledge Step by step introduction to the theory of stellar evolution Includes many examples of stars at different stages in their evolution that the reader can observe for him/herself Mathematics is made accessible by being presented in boxes that readers can skip over if they prefer **The NexStar User's Guide** Michael Swanson,2012-12-06 Celestron's NexStar telescopes along with Meade's ETX and LX ranges together dominate the international market for affordable computer controlled go to telescopes Michael Swanson has written this complete detailed

guide to buying using and maintaining NexStar telescopes to appeal to all buyers or potential buyers of these telescopes It contains just about everything from basic descriptions of models to technical details of alignment and even programming Although this book is highly comprehensive it is suitable for beginners there is a chapter on Astronomy Basics and experts alike Every NexStar owner and anyone thinking of buying a NexStar will want this book Astronomy of the Milky Way Mike Inglis,2012-12-06 One of the wonders of the universe we live in is the Milky Way It spans the entire sky and can be seen every night of the year from anywhere on Earth This is the first book that deals specifically with what can be seen within the Milky Way from a practical observer's point of view Astronomy of the Milky Way covers every constellation that the Milky Way passes through and describes in detail the many objects that can be found therein including stars double and multiple stars emission nebulae planetary nebulae dark nebulae and supernovae remnants open and galactic clusters and galaxies It also describes the one thing that is often left out of observing guides the amazing star clouds of the Milky Way itself It is one of a two volume set that deal with the entire Milky Way this second volume looks at what can be seen predominantly from the Southern skies In addition to the descriptive text there are many star charts and maps as well as the latest up to date images made by observatories around the world and in space as well as images taken by amateur astronomers Equipped with this book an amateur astronomer can go out on any clear night of the year and observe the galaxy we live in The Milky Way

From Casual Stargazer to Amateur Astronomer Dave Eagle,2013-10-16 The beginning astronomical observer passes through a series of stages The initial stage is hugely exciting and gives the beginner a real buzz as he discovers some of the faint fuzzy objects markings on the planets rings around Saturn and the craters on the Moon But as the novice observer progresses he or she wants to know what more there is than looking at faint fuzzy blobs or indistinct planet markings Many jump to the conclusion wrongly that they need to spend lots of money on expensive equipment to progress From Casual Stargazer to Amateur Astronomer has been written specifically to address this group of budding stargazers Astronomy is much more than a quick sightseeing tour Patient observers who can develop their skills will start to appreciate what they are seeing and will know exactly what to look out for on any particular night And equally important they will learn what not to expect to see From Casual Stargazer to Amateur Astronomer is for those who want to develop observing skills beyond mere sightseeing and learn some of the techniques used to carry out enjoyable and scientifically useful observations It will also direct readers to make informed choices about what can be seen and when This book is for anyone keen to develop their skills as an amateur astronomer Guide to Observing Deep-Sky Objects Jeff Farinacci,2008 Guide to Observing Deep Sky Objects is an invaluable reference for all amateur astronomers The book contains for each constellation 1 a star chart showing the Bayer labels 2 a table for many of the stars in the constellation along with their positions and magnitudes and 3 a table of the major deep sky objects in the constellation with relevant observational data Facing pages provide unique year long graphs that show when the constellation is visible in the sky which allows the user to quickly determine whether a given

constellation can be seen and when the best time to see it will be

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