Fundamentals of solar astronomy

by Arvin Bhatnagar & William Livingston

World Scientific, 2005. ISBN 981-256-357-1. Pp 445, £20.00 (Amazon), pbk.

This book is an up-to-date bridge between e.g. Ronald Giovanelli's pictorial *Secrets of the Sun* and Christopher Durrant's mathematical *The Atmosphere of the Sun*. Its phenomenological sections encompass early observations, modern observatories, atmospheric structure, and characteristics of the quiet and active Sun, with shorter discussions on eclipses and helioseismology.

Of particular interest to BAA observers will be the two major sections on observational techniques and optical instrumentation. Some of the images are quite spectacular. However, it appears that the publication date was too early for discussion of the recent very high-resolution sunspot images obtained using adaptive optics; see: **http://www.sunspot.noao.edu/press/DALSA/.**

Of special interest to this reviewer are the subsections on solar atmospheric temperature: the text explains in physical detail why different temperatures are derived depending on the observational technique adopted, namely continuum, excitation or ionisation radiation. Basically, the visible Sun is weakly in non-equilibrium, but also the emitting species depend on atmospheric depth. Hence in a radial temperature gradient they belong to different thermal populations.

The book contains a useful glossary and extensive reference list, and is a valuable addition to my bookshelf. Some of the English is terse and almost 'note-form'. However, the technical sense is clear. Equation (6.8) should read $\frac{1}{2}mv^2 = 3/2\ kT_k$, for consistency with the conclusion.

The book can be used either as a stand-alone work on solar phenomena, or as a reference text with 'leads' to more in-depth research data and authorities/institutions. Livingston's conclusion, after around 50 years active solar research, is that: 'Except for transient activity (sunspots) the Sun is constant'. On our timescale!

David Airey

Dr David Airey is an ex-professional optical spectroscopist specialising in high temperature terrestrial plasmas, and is now applying these techniques to the Sun.

Fundamental Astronomy H. Karttunen P. KrÃ¶ger H. Oja M. Poutanen K. J. Donner (Eds.)Â However, we solar system; Juhani KyrÃ¶lÃ¤inen expanded the chapter believe that the audience will also include many serious on stellar spectra; Timo Rahunen rewrote most of the amateurs, who often find the popular texts too trivial. chapters on stellar structure and evolution; Ilkka Tuomi- The lack of a good handbook for amateurs has become nen revised the chapter on the Sun; Kalevi Mattila. Ancient Solar Astronomy Modern Solar Observatories Structure of Solar Atmosphere The Quiet Sun The Active Sun Observational Techniques Solar Optical Instrumentation Solar Eclipses Solar Interior Through and Helioseismology On the Joy of Observing the Sun -- A Personal Experience.Â @inproceedings{Bhatnagar2005FundamentalsOS, title={Fundamentals of solar astronomy}, author={Arvind Bhatnagar and William Charles Livingston}, year={2005} }.

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