

## Preface

The first edition of this text appeared in 1994. Shortly after the third printing, our editor suggested that we attempt a second edition because new developments in stellar structure and evolution had made our original work outdated. We (the original authors, CJH and SDK) reluctantly agreed but with reservations due to the effort involved. Our initial reluctance disappeared when we were able to convince (cajole, twist the arm of, etc.) our new coauthor-colleague Virginia Trimble to join us. (Welcome Virginia!) We (i.e., all three of us) hope that you agree that the present edition is a great improvement compared to the 1994 effort.

Our objectives in this edition are the same ones we set forth in 1994:

What you will find is a text designed for our target audience: the typical senior undergraduate or beginning graduate student in astronomy or astrophysics who wishes an overview of stellar structure and evolution with just enough detail to understand the general picture. She or he can go on from there to more specialized texts or directly to the research literature depending on talent and interests. To this end, this text presents the basic physical principles without chasing all the (interesting!) details.

For those of you familiar with the first edition, you will find that some things have not been changed substantially ( $F = ma$  is still  $F = ma$ ), while others definitely have. For example, Chapter 2 has been completely rewritten. In many respects this chapter is the key to the text because it gives an extensive overview of the subject. The next eight chapters rely on the student's having absorbed large parts of Chapter 2, though complete understanding is not necessary. Many students may wish to start with Chapter 2, although we recommend at least a once-through of Chapter 1, which contains some fundamental material. And, in response to many requests, there is substantially more observational material.

We have also attempted to improve on the graphics and have included more than we did in the first edition. In addition, the instructor will find many more "Exercises" at the end of chapters. They are a mixed bag (easy, moderate, difficult) but we hope they illuminate much of what we have to say. (Chapter 2 has more than its share; and, in fact, Chapters 1 and 2, plus exercises, could be the basis of a mini-course.)

Also new is the inclusion on the inside back cover of a CD-ROM containing computer programs that make decent “zero-age main sequence” stellar models and analyse those models for “pulsations” (radial and nonradial), and stellar evolution codes everyone can play with. All are in **FORTRAN** and should work on most computer platforms. Some of these codes are of our doing and we thank Andy Odell and Dean Pesnell (Nomad Research) for their generous contributions. As an additional bonus we have included portions of a colorful and informative *Stellar Evolution Tutorial* put together by John Lattanzio and his colleagues (as part of a commercial enterprise called Cantanout Ltd.). See the **README** files on the CD-ROM for more information on the programs and tutorial.

*Acknowledgments:* We wish to thank our many past and present senior colleagues and students for numerous reprints, corrections, suggestions, comments, problems (i.e., exercises), book loans, help with computer glitches, and PostScript figure files. They made our task much easier and enjoyable. Blame the typos, mistakes, and confusion on us. In particular, for the second edition, we thank Dave Arnett, Mitch Begelman, David Branch, Nic Brummell, Joe Cassinelli, Maurice Clement, Peter Conti, Ethan Hansen, Henny Lamers, Michael McCarthy, Cole Miller, Sean O’Brien, Dean Richardson, Dimitar Sasselov, Ted Snow, Peter Stetson, Pat Thaddeus, Juri Toomre, Don Vandenberg, Craig Wheeler, Matt Wood, and Ellen Zweibel. VT gives personal thanks to those people from whom she first learned that stellar structure and evolution is an exciting topic—namely, (the late) Thornton Leigh Page, J. Beverly Oke, and Bohdan Paczyński. She also recognizes the past encouragement and support of UCLA, CalTech, and the Stony Brook Summer School. CJH and SDK wish to thank their families and especially their wives Camille and Leslie: may they not become computer widows *yet* again. Finally, we send many kudos to our editors at Springer-Verlag.

The text was set in L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> by the authors.

Carl J. Hansen  
Steven D. Kawaler  
Virginia Trimble

University of Colorado at Boulder  
Iowa State University at Ames  
University of California at Irvine,  
University of Maryland at College Park



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Hansen, C.J.; Kawaler, S.D.; Trimble, V.

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