

Preface

Although I have had a long interest in astrophysics, my training has been in gravitational physics. I returned to astrophysics by way of gravitational wave astronomy, whose primary sources are expected to be binary systems containing white dwarfs, neutron stars, or black holes. It became necessary for me to learn about the astrophysics of the birth and evolution of systems that give rise to these sources.

The best way to learn a new subject is to teach a course on it. This book has arisen from an introductory graduate course in stellar astrophysics that I taught in 2007 at the University of Texas at Brownsville. Many of my students were preparing to be gravitational wave physicists and had little or no prior coursework in astronomy or astrophysics. Thus, I needed a book that started from the very basics of astronomy, but very quickly focused on stellar evolution. Unfortunately, I found no text that met my needs, and so I began writing my own detailed notes for class. These have evolved into the present textbook.

The intended audience consists of upper-level undergraduates or first-year graduate students in physics. Although narrowly focused on stellar evolution, the subject is still broad enough that individual topics are not covered in depth. The book is organized into four sections—measuring stars, equations and processes, stellar models, and dynamical systems. I have tried to provide enough background in each area so that students will have the necessary vocabulary for more in-depth studies of any topic covered in the book.

I have benefitted from numerous conversations and discussions with colleagues at the Center for Gravitational Wave Astronomy, who have helped with developing heuristic arguments in support of the mathematical treatments of many topics in this book. I would also like to acknowledge the students in my courses from 2007 to 2012, who served as both test subjects and proofreaders for the text. Of course, any and all errors in the text are my own. The final editing and polishing of the text were done at the Aspen Center for Physics, whose peaceful environment and wonderful support staff have made this an enjoyable process.

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Stars

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