Preface to the Second Edition

Twenty years after its first publication, this textbook is still a major reference for scientists and students interested in or working on problems of stellar structure and evolution. But with the incredible growth of computational power, the computation of stellar models has to large extent become a standard tool for astrophysics. While the early computations were restricted to single choices for mass, compositions and possibly evolutionary stage, by now models for the whole parameter space exist. The first edition of this book was restricted to a few examples for low- and intermediate-mass star evolution and lacked the broader view now being possible. There are even semi-automatic stellar evolution codes that may be used remotely via the Internet.

However, stellar evolution programs should not be used without a thorough understanding of the stellar physics. Therefore, a textbook concentrating on the foundations of the theory and explaining in detail specific phases and events in the life of a star is very much needed to allow scientifically solid modelling of stars. This is the reason why this book deserved a second edition.

Much to our regret, A. Weigert passed away two years after publication of the first edition. He left a gap that cannot be filled. Given the above mentioned need for a second edition and the requirement to add up-to-date stellar models, it was decided to have A. Weiss join R. Kippenhahn in preparing the new edition.

The two authors of this book came to discriminate between the *eternal truth* and the *mutable* parts. The latter ones refer to the current state of modelling and knowledge obtained from numerical models and their comparison to observations. Such chapters were updated, extended, or added. As far as possible, the stellar models shown were specifically calculated for this purpose, with the present, much evolved version of the original code by Kippenhahn, Weigert, and Hofmeister. The numerical results are therefore much more homogeneous and consistent than in the first edition.

The *eternal truth* concerns the aforementioned basic physics and their understanding. These parts of the book have been left almost untouched, since the authors (and those readers who were consulted) did not see any reason to change them.

The authors are indebted to many friends and colleagues who gave their advice or comments, with respect to both necessary changes and the new text passages.

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Norbert Grüner's help in the difficult task of generating a useful index is acknowledged, too.

Last, but not least, we thank Mrs. Rosmarie Mayr-Ihbe, who designed, corrected, and improved the many figures that we added to this second edition.

Garching Achim Weiss
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