

1. Record Nr.	UNINA9910962858903321
Autore	Kippenhahn Rudolf
Titolo	Stellar Structure and Evolution // by Rudolf Kippenhahn, Alfred Weigert
Pubbl/distr/stampa	Berlin, Heidelberg : , : Springer Berlin Heidelberg : , : Imprint : Springer, , 1990
ISBN	3-642-61523-6
Edizione	[1st ed. 1990.]
Descrizione fisica	1 online resource (XVI, 468 p. 7 illus.)
Collana	Astronomy and Astrophysics Library, , 2196-9698
Disciplina	523.8
Soggetti	Astronomy Astrophysics Astronomy, Observations and Techniques
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	I The Basic Equations -- 1. Coordinates, Mass Distribution, and Gravitational Field in Spherical Stars -- 2. Conservation of Momentum -- 3. The Virial Theorem -- 4. Conservation of Energy -- 5. Transport of Energy by Radiation and Conduction -- 6. Stability Against Local, Non-spherical Perturbations -- 7. Transport of Energy by Convection -- 8. The Chemical Composition -- II The Overall Problem -- 9. The Differential Equations of Stellar Evolution -- 10. Boundary Conditions -- 11. Numerical Procedure -- 12. Existence and Uniqueness of Solutions -- III Properties of Stellar Matter -- 13. The Ideal Gas with Radiation -- 14. Ionization -- 15. The Degenerate Electron Gas -- 16. The Equation of State of Stellar Matter -- 17. Opacity -- 18. Nuclear Energy Production -- IV Simple Stellar Models -- 19. Polytopic Gaseous Spheres -- 20. Homology Relations -- 21. Simple Models in the U-V Plane -- 22. The Main Sequence -- 23. Other Main Sequences -- 24. The Hayashi Line -- 25. Stability Considerations -- V Early Stellar Evolution -- 26. The Onset of Star Formation -- 27. The Formation of Protostars -- 28. Pre-Main-Sequence Contraction -- 29. From the Initial to the Present Sun -- 30. Chemical Evolution on the Main Sequence -- VI Post-Main-Sequence Evolution -- 31. Evolution Through Helium Burning — Massive Stars -- 32. Evolution Through Helium Burning — Low-Mass Stars -- 33. Later Phases -- 34. Final Explosions and Collapse -- VII Compact Objects -- 35. White Dwarfs --

36. Neutron Stars -- 37. Black Holes -- VIII Pulsating Stars -- 38. Adiabatic Spherical Pulsations -- 39. Non-adiabatic Spherical Pulsations -- 40. Non-radial Stellar Oscillations -- IX Stellar Rotation -- 41. The Mechanics of Rotating Stellar Models -- 42. The Thermodynamics of Rotating Stellar Models -- 43. The Angular-Velocity Distribution in Stars.-References.

Sommario/riassunto

The attempt to understand the physics of the structure of stars and their change in time - their evolution - has been bothering many physicists and astronomers ever since the last century. This long chain of successful research is well documented not only by numerous papers in the corresponding journals but also by a series of books. Some of them are so excellently written that despite their age they can still be recommended, and not only as documents of the state of the art at that time. A few outstanding examples are the books of R. Emden (1907), A. S. Eddington (1926), S. Chandrasekhar (1939), and M. Schwarzschild (1958). But our science has rapidly expanded in the last few decades, and new aspects have emerged which could not even be anticipated, say, 30 years ago and which today have to be carefully explored. This does not mean, however, that our ambition is to present a complete account of the latest and most refined numerical results. This can well be left to the large and growing number of excellent review articles. The present book is intended rather to be a textbook that will help students and teachers to understand these results as far as possible and present them in a simple and clear manner. We know how difficult this is since we ourselves have tried for the largest part of our scientific career to understand "how the stars work" - and then to make others believe it.
