1. Record Nr. UNINA9910300381703321

Autore	Keeton Charles
Titolo	Principles of Astrophysics : Using Gravity and Stellar Physics to Explore the Cosmos / / by Charles Keeton
Pubbl/distr/stampa	New York, NY : , : Springer New York : , : Imprint : Springer, , 2014
ISBN	1-4614-9236-X
Edizione	[1st ed. 2014.]
Descrizione fisica	1 online resource (XXI, 434 p. 119 illus., 37 illus. in color.)
Collana	Undergraduate Lecture Notes in Physics, , 2192-4791
Classificazione	US 2000
Disciplina	523.01
Soggetti	Astronomy Astrophysics Gravitation Mechanics Mechanics, Applied Astronomy, Astrophysics and Cosmology Classical and Quantum Gravitation, Relativity Theory Classical Mechanics Theoretical and Applied Mechanics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Introduction: Tools of the Trade -- Part I: Using Gravity and Motion to Measure Mass -- Celestial Mechanics -- Gravitational One-Body Problem -- Gravitational Two-Body Problem -- Tidal Forces -- Gravitational Three-Body Problem -- Extended Mass Distributions: Spiral Galaxies -- N-Body Problem: Elliptical Galaxies -- Bending of Light by Gravity -- Relativity -- Cosmology: Expanding Universe -- Part II: Using Stellar Physics to Explore the Cosmos -- Planetary Atmospheres -- Planetary Temperatures -- Stellar Atmospheres -- Nuclear Fusion -- Stellar Structure and Evolution -- Stellar Remnants -- Charting the Universe with Stars -- Star and Planet Formation -- Cosmology: Early Universe -- Part III: Appendices -- Appendix A: Technical Background -- Appendix B: Solutions.
Sommario/riassunto	This book gives a survey of astrophysics at the advanced undergraduate level. It originates from a two-semester course

sequence at Rutgers University that is meant to appeal not only to astrophysics students but also more broadly to physics and engineering students. The organization is driven more by physics than by astronomy; in other words, topics are first developed in physics and then applied to astronomical systems that can be investigated, rather than the other way around. The first half of the book focuses on gravity. Gravity is the dominant force in many astronomical systems, so a tremendous amount can be learned by studying gravity, motion and mass. The theme in this part of the book, as well as throughout astrophysics, is using motion to investigate mass. The goal of Chapters 2-11 is to develop a progressively richer understanding of gravity as it applies to objects ranging from planets and moons to galaxies and the universe as a whole. The second half uses other aspects of physics to address one of the big questions. While “Why are we here?” lies beyond the realm of physics, a closely related question is within our reach: “How did we get here?” The goal of Chapters 12-21 is to understand the physics behind the remarkable story of how the Universe, Earth and life were formed. This book assumes familiarity with vector calculus and introductory physics (mechanics, electromagnetism, gas physics and atomic physics); however, all of the physics topics are reviewed as they come up (and vital aspects of vector calculus are reviewed in the Appendix). This volume is aimed at undergraduate students majoring in astrophysics, physics or engineering.