

1. Record Nr.	UNINA9910735388203321
Autore	Musielak Dora
Titolo	Leonhard Euler and the Foundations of Celestial Mechanics / / by Dora Musielak
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2022
ISBN	9783031123221 9783031123214
Edizione	[1st ed. 2022.]
Descrizione fisica	1 online resource (228 pages)
Collana	History of Physics, , 2730-7557
Disciplina	510.92
Soggetti	Physics - History Gravitation Physicists Astronomers Outer space - Exploration Astronautics Mechanics Mathematical analysis History of Physics and Astronomy Newtonian Physics Biographies of Physicists and Astronomers Space Exploration and Astronautics Classical Mechanics Analysis
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Stella Nova: Euler's Study of Newtonian and Cartesian Physics -- Euler's Grand Tour -- Watching the Northern Light: Basic Analysis of Celestial Mechanics -- Rhythms of the Sea: A Theory of Tides -- Beyond the Prussian Sky: Theories of Motion in the Solar System -- Cosmic Wanderers: Motion of Comets and Comet Tail Theory.
Sommario/riassunto	The intention of this book is to shine a bright light on the intellectual context of Euler's contributions to physics and mathematical

astronomy. Leonhard Euler is one of the most important figures in the history of science, a blind genius who introduced mathematical concepts and many analytical tools to help us understand and describe the universe. Euler also made a monumental contribution to astronomy and orbital mechanics, developing what he called *astronomia mechanica*. Orbital mechanics of artificial satellites and spacecraft is based on Euler's analysis of astromechanics. However, previous books have often neglected many of his discoveries in this field. For example, orbital mechanics texts refer to the five equilibrium points in the Sun-Earth-Moon system as Lagrange points, failing to credit Euler who first derived the differential equations for the general n-body problem and who discovered the three collinear points in the three-body problem of celestial mechanics. These equilibrium points are essential today in space exploration; the James Webb Space Telescope (successor to the Hubble), for example, now orbits the Sun near L2, one of the collinear points of the Sun-Earth-Moon system, while future missions to study the universe will place observatories in orbit around Sun-Earth and Earth-Moon equilibrium points that should be properly called Euler-Lagrange points. In this book, the author uses Euler's memoirs, correspondence, and other scholarly sources to explore how he established the mathematical groundwork for the rigorous study of motion in our Solar System. The reader will learn how he studied comets and eclipses, derived planetary orbits, and pioneered the study of planetary perturbations, and how, old and blind, Euler put forward the most advanced lunar theory of his time.
