



Beyond the Mechanical Universe: From Electricity to Modern Physics

By Richard P. Olenick, Tom M. Apostol, David L. Goodstein

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This second volume of the Mechanical Universe studies electricity and magnetism, their relation to each other and light, and shows how the problem of light led to the special theory of relativity. Then, it moves on to modern physics, where particles may behave like waves and where some of the great verities of Newtonian physics appear less certain. Along with the first volume, this book is based on, though independent of, a public television series broadcast in the United States. Physics is presented as a human endeavor, with historical development forming a thread throughout the text. The prerequisites are minimal, only basic algebra and trigonometry since the necessary calculus is developed in the text, with physics providing the motivation. New concepts are introduced at the natural, logical point with many historical references to place physics in a social perspective. Many topics from twentieth-century physics are included. The book is attractively illustrated and will be a stimulating alternative to other, less-thorough treatments.

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Editorial Review

Review

"Olenick (U. of Dallas), Apostol (California Institute of Technology) and Goodstein (California Institute of Technology) have produced this textbook on electricity and magnetism, and how the relationship between these two forces led to the Theory of Relativity. Written primarily for physics and engineering students, the authors have emphasized the human aspects of understanding physics so that only a basic knowledge of algebra and trigonometry is needed to explore the mathematical applications of the text. As a result, these foundations of modern physics can also be enjoyed from a historical aspect and will appeal to many students from other disciplines who desire a more in-depth knowledge of the world around them."

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"The material in this textbook is presented in a clear and readable manner. A multitude of diagrams aid student understanding as does the abundance of problems, to such an extent that although based on the Mechanical Universe television series, this volume can act as an independent resource."

Contemporary Physics

About the Author

Richard P. Olenick is currently the chair of Department of Physics at University of Dallas. He was Associate Project Director of the PBS Series The Mechanical Universe and Beyond the Mechanical Universe, which accompanied this textbook and its successors. He has received numerous grants from the National Science Foundation and the US Department of Education for his work in physics education. His current project is C3P, which developed an inquiry-based curriculum for high school physics. In 1995, Dr Olenick was named Texas Professor of the Year by the Carnegie Foundation and in 1997, he was named a Minnie Piper Steven Professor. In 2003, he became the Nancy Cain Marcus and Jeffrey A. Marcus Chair in Science and in 2005 he received the King Award from the University of Dallas, which is the highest honor the University can bestow on a faculty member.

Tom M. Apostol joined the California Institute of Technology faculty in 1950 and is now Professor of Mathematics, Emeritus. He is internationally known for his textbooks on Calculus, Analysis, and Analytic Number Theory, which have been translated into 5 languages, and for creating Project MATHEMATICS!, a series of video programs that bring mathematics to life with computer animation, live action, music, and special effects. The videos have won first-place honors at a dozen international video festivals, and have been translated into Hebrew, Portuguese, French and Spanish. His list of publications includes 98 research papers, 46 of them published since he retired in 1992. He has received several awards for his research and teaching. In 1978 he was a visiting professor at the University of Patras in Greece, and in 2000 was elected a Corresponding Member of the Academy of Athens, where he delivered his inaugural lecture in Greek.

Dr David L. Goodstein is Vice Provost and Professor of Physics and Applied Physics at the California Institute of Technology, where he has been on the faculty for over 35 years. In 1995, he was named the Frank J. Gilloon Distinguished Teaching and Service Professor. In 1999, Dr Goodstein was awarded the Oersted Medal of the American Association of Physics Teachers, and in 2000, the John P. McGovern Medal of the Sigma Xi Society. He has served on and chaired numerous scientific and academic panels, including the National Advisory Committee to the Mathematical and Physical Sciences Directorate of the National Science Foundation. He is a founding member of the Board of Directors of the California Council on Science and Technology. His books include States of Matter and Feynman's Lost Lecture, written with his wife, Dr

Judith Goodstein. In the 1980's, he was Director and host of The Mechanical Universe television program.

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