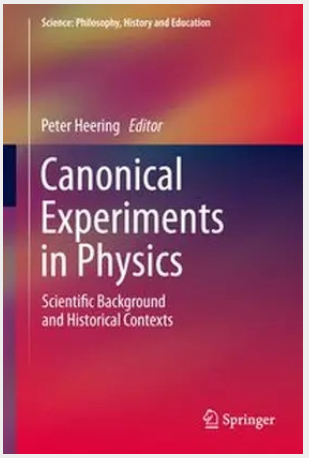
Heering

Canonical Experiments in Physics

Scientific Background and Historical Contexts



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This book offers a deeper understanding of canonical experiments in physics in 14 case studies and provides background information on the design of and the performance with the apparatus, as well as the respective historical context. Special Features: It discusses how exactly these experiments were conducted and the physical reasons behind the choice of instruments used. It also explains why the respective researchers carried out these experiments and how their results came to be accepted. While a number of these experiments and their basic principles appear to be familiar, this book provides the background necessary to understand the challenges that arise when experimenting and which can also make experimental work so appealing. It illustrates why researchers conduct research, what motivates them, and how scientific practices change over time. The case studies brought together here thus contribute to understanding physics not as a fixed body of knowledge, but as a culturally influenced, human-driven process. Two additional chapters address the educational potential of these case studies. The Content: Hooke's law - Newton's prismatic color decomposition - Coulomb's law - Young's double slit experiment - Ohm's law - The measurement of the speed of light by Fizeau or Foucault - Joule's determination of the mechanical heat equivalent - Spectral analysis according to Bunsen and Kirchhoff - Wilson's cloud chamber - The Franck-Hertz Experiment - Millikan's determination of elementary charge - The Geiger-Müller counter tube - Cosmic background radiation Prerequisites: Basic knowledge of physics is helpful but not required. Target audience: The book is particularly suitable for students (both academic and teaching) as well as teachers at universities and colleges. The Editor: Peter Heering is professor of physics, its didactics and its history at the Europa-Universität Flensburg. In his research, he deals with the analysis of historical experimental practices, which he examines using the replication method, with the history of science education, and with the implementation of historical content in science education. Translated with AI assistance, selectively expanded and fully revised by the authors in collaboration with Don Metz.

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