

Preface

The book is addressed to physicists involved in teaching physics at different levels (high school, college, and university), and to advanced students. Mainly, the book contains computer-assisted experiments and demonstrations. As a rule, such experiments may be performed in a short time, and many of the laboratory experiments may also serve as lecture demonstrations. Most of the experiments and demonstrations employ the *ScienceWorkshop* data-acquisition system with *DataStudio* software from PASCO scientific. It is very convenient to use this system in student laboratories. Additional equipment for the experiments was purchased mainly from PASCO.

The book contains 88 experiments and demonstrations. Many are computer-assisted versions of experiments described in laboratory manuals (Iveronova 1962, 1967, 1968; Portis 1964, 1972; Portis and Young 1971; Soloukhin 1975, 1983; Goldin 1983; Meiners *et al.* 1987; Melissinos and Napolitano 2003; Mitin *et al.* 2003), as well as some experiments and demonstrations recommended by PASCO and PHYWE.

The first chapter, *Introductory Experiments*, describes experiments suitable for high schools (20 items). The subsequent chapters include experiments and demonstrations in *Mechanics and Molecular Physics* (10), *Electricity and Magnetism* (10), *Optics and Atomic Physics* (10), and *Condensed Matter Physics* (8). A chapter, *Nobel Prize Experiments*, contains several milestone experiments of the twentieth century (8). An additional chapter comprises *Student Projects* (22), which are addressed mainly to students of high schools and colleges.

The list of references given in the book contains about 600 items. Nevertheless, many relevant references were not included, for which I apologize.

Many of the experiments were tested during laboratory courses for Bar-Ilan students in physics and electrical engineering. However, some of the experiments were developed especially for the book. All the illustrations pertain to actual measurements.

I am thankful to my colleagues for many useful discussions and much practical help, especially Professor Arkadii Arinstein, Professor Nathan Aviezer, Professor Moshe Deutsch, Professor Benjamin Ehrenberg, Dr. Alex Friedman, Dr. Vladimir Ginodman, Professor Moshe Gitterman, Professor Haim Halpern, Professor Yuri Kaganovskii, Professor Eugene Kogan, Dr. Faina Kopansky, Professor Israel Laulicht, Dr. Shlomo Mansour, Professor Issai Shlimak, Professor Yehuda T. Suss, Professor Haim Taitelbaum, Dr. Shuki Wolfus, and Professor Yosef Yeshurun.

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