

Preface

Part 2 of *A Guide to Physics Problems* contains problems from written graduate qualifying examinations at many universities in the United States and, for comparison, problems from the Moscow Institute of Physics and Technology, a leading Russian Physics Department. While Part 1 presented problems and solutions in Mechanics, Relativity, and Electrodynamics, Part 2 offers problems and solutions in Thermodynamics, Statistical Physics, and Quantum Mechanics.

The main purpose of the book is to help graduate students prepare for this important and often very stressful exam (see Figure P.1). The difficulty and scope of the qualifying exam varies from school to school, but not too dramatically. Our goal was to present a more or less universal set of problems that would allow students to feel confident at these exams, regardless of the graduate school they attended. We also thought that physics majors who are considering going on to graduate school may be able to test their knowledge of physics by trying to solve some of the problems, most of which are not above the undergraduate level. As in Part 1 we have tried to provide as many details in our solutions as possible, without turning to a trade expression of an exhausted author who, after struggling with the derivation for a couple of hours writes, “As it can be easily shown....”

Most of the comments to Part 1 that we have received so far have come not from the students but from the professors who have to give the exams. The most typical comment was, “Gee, great, now I can use one of your problems for our next comprehensive exam.” However, we still hope that this does not make the book counterproductive and eventually it will help the students to transform from the state shown in Figure P.1 into a much more comfortable stationary state as in Figure P.2. This picture can be easily attributed to the present state of mind of the authors as well, who sincerely hope that Part 3 will not be forthcoming any time soon.