

CHAPTER OVERVIEW

1: Introduction

The structure of this course is more or less traditional for graduate physics education, with most attention paid to the non-relativistic quantum mechanics, and only Chapter 9 reviewing the relativistic effects. As in many (though not all) textbooks on this level, the discussion of Dirac's bra-ket formalism is postponed until after the discussion of numerous quantum-mechanical effects in Chapters 1-3 by using the conceptually simpler wave-mechanics approach. One reason for that decision was the author's serious commitment to the Occam Razor principle, in particular to the analysis of each physical effect by using the simplest suitable theoretical tools. A really distinguishing feature of the course is Chapter 7 on open quantum systems, with a focus on the decoherence ('dephasing') and energy dissipation ('relaxation') effects. These effects are frequently discussed in statistical physics courses, but their understanding is necessary for any informed discussion of quantum measurements and quantum effects in macroscopic systems, with their substantial coupling to the environment.

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