

Preface

These notes arose from a graduate course that I taught for several years to students interested in particle physics and field theory. Most of the material in the first part is strictly quantum mechanical and fairly standard. In this part I develop in detail the important concepts of discrete and continuous symmetries of the Klein-Gordon and Dirac equations. I also deemed it important to include a section on central force problems for the Dirac equation since this is once again of interest in nuclear physics.

In the second part I wanted to introduce the students to some of the main ideas of field theory via the canonical formalism. Although I know that, to quote Schwinger, “Like the silicon chip of more recent years, the Feynman diagram was bringing computation to the masses”, these days it is functional methods that are the computational tools of the masses, I nevertheless felt that students should be first exposed to the canonical formalism that has proved so robust for almost three-quarters of a century. It is a beautiful subject, worthy of study.

As in all such endeavours, I have been helped most by all the students who took this course from me over the past several years and forced me to refine my explanations. I thank them most sincerely and hope they got as much out of my course as I got from them.

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June, 2002.