

Chapter 1

Introduction

We have organized the topics in order of complexity, and, in the same spirit of the previous book [1], we have tried to write the calculations as detailed as possible. In Chapter 2 we included the building blocks of quantum field theory, in Chapter 3 we introduce the S -matrix in the Schrödinger Picture separating the kinematical and normalization factors from the matrix element, and the expressions for the decay rates and cross sections are obtained. The explicit calculation of the matrix element from the expansion of the S -matrix to obtain the Feynman rules, is postponed to Chapter 5. In Chapter 4 we use the Feynman rules necessary to calculate the matrix element, and develop the techniques associated to the squaring of the matrix element. In Chapter 5 we obtain the Feynman rules used in two body decays directly from the first order expansion of the S -matrix in the interaction picture. The subsequent chapters have applications of the techniques developed to the calculation of tree-level, Chapter 6 and loop processes.

This notes are based in books [2], [3], [4]. In each Chapter or Section the main reference used is cited. Also, we have included material developed by students Juan Alberto Yopez, José David Ruiz Álvarez. This notes are written in English, because at this level it is expected that any physics student be fluently in reading technical texts in this language.

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