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References for the lecture
Effective Field Theories

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Abstract

This lecture provides an introduction to the framework of low energy effective field theories. After developing the basic concepts, the method is used to analyze electromagnetic, weak and strong interactions at low energies. The course is intended for master or graduate students, who have taken a first course in quantum field theory.

Many of the listed references are freely available through our library and the arXiv preprint server. A useful resource is also the iNSPIRE Hep Database.

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1 Introduction

2 The Wilsonian effective action [1, 2]

2.1 Integrating out high-energy modes

2.2 Classification of operators

2.3 Renormalization group

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3.1 Tree-level matching calculations

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3.5 Renormalization group improved perturbation theory

4 The Standard Model at low energies

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5.1 Heavy Quark Effective Theory (HQET) [14, 20]

5.2 Nonrelativistic Effective Theories [4, 21]

5.2.1 Nonrelativistic QCD (NRQCD)

5.2.2 Potential Nonrelativistic QCD (pNRQCD) [22–24]

6 Energetic particles and jet physics

6.1 Method of regions [25]

6.2 Soft-Collinear Effective Theory [26–28]

7 Further examples

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- 7.2** Nucleon-nucleon interaction EFTs [29]
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- 7.5** Thermal effective field theories [33]
 - 7.5.1** Dimensionally reduced effective field theory for hot QCD
 - 7.5.2** Hard Thermal Loops effective theory

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