A Very Impressive and Fancy Tile for a Thesis

by

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Thesis

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Abstract

Acknowledgements

Part I

Introduction to QCD and Lattice Field Theories

Chapter 1

A Primer on QCD in the Continuum

Quantum Chromodynamics, commonly referred to as QCD, is the quantum field theory that describes the behaviour of strongly interacting matter, that is quarks and gluons. It is a non-abelian gauge theory based on a $SU(3)$ symmetry group. In this chapter we will discuss how the QCD lagrangian density is obtained, how it links with the Standard Model of particle physics (SM) and some of the major results of the thoery. [1]

1.1 Derivation of the QCD Largangian

Starting from a complex fermion field $\psi(x)$ we can construct a vector of N such fields. The case of the strong force is that of $N = 3$:

$$\psi(x) = \begin{pmatrix} \psi_a(x) \\ \psi_b(x) \\ \psi_c(x) \end{pmatrix} \tag{1.1}$$

We then construct a lagrangian density starting from Dirac's equation:

$$\mathcal{L} = i\bar{\psi}(\partial\!\!\!/ - m)\psi \tag{1.2}$$

a change

Chapter 2

QCD on the Lattice

Chapter 3

Pure Gauge Theories: a First Implementation

Part II

A QCD problem I should be considering

Chapter 4

The nucleon EDMa?

Part III

Conclusion and Discussion

Chapter 5

Summary and Conclusion

Chapter 6

Future Developements

Bibliography

[1] Schroder Peskin. *An Introduction to Quantum Field Theory.* Cambridge University Press, 1989.