

Introduction to Classical Field Theory

A Tour of the Fundamental Interactions

This book is a short introduction to classical field theory, most suitable for undergraduate students who have had at least intermediate-level courses in electromagnetism and classical mechanics. The main theme of the book is showcasing role of fields in mediating action-at-a-distance interactions. Suitable technical machinery is developed to explore at least some aspect of each of the four known fundamental forces in nature. Beginning with the physically-motivated introduction to field theory, the text covers the relativistic formulation of electromagnetism in great detail so that aspects of gravity and the nuclear interaction not usually encountered at the undergraduate level can be covered by using analogies with familiar electromagnetism. Special topics such as the behavior of gravity in extra, compactified dimensions, magnetic monopoles and electromagnetic duality, and the Higgs mechanism are also briefly considered.



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