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Hadron Physics: Effective Theories of Low Energy QCD ...
The study of hadrons unites a variety of theoretical approaches, ranging from low-energy QCD dynamics, chiral perturbation theory, and meson and baryon phenomenology, to the effects of hot and dense nuclear matter. Fruitful crosslinks between these topics had become clear in the recent past. These proceedings form a coherent overview of the actual state of low-energy hadron physics.

Hadron Physics: Effective Theories of Low Energy QCD ...
Feng-Kun Guo (ITP) EFT for Hadron Physics 03. 2016 4 / 76. Quantum Electrodynamics (QED) Basic interaction vertex in QED. Photon does not carry charge, photon-photon interaction only happens at higher orders. Coupling constant is small,great success of perturbation theory?1=137 =) E.g., the electron magnetic moment.

Introduction to Effective Field Theories for Hadron Physics
Heavy hadron molecules were first theorized from a crude analogy with the deuteron and the nuclear forces binding it, a conjecture which was proven to be on the right track after the discovery of the X(3872). However, this analogy with nuclear physics has not been seriously exploited beyond a few calculations in the two- and three-body sectors, leaving a great number of possible theoretical consequences unexplored.

Heavy hadron molecules in effective field theory: the ...
There emerge basically two principally different types of effective hadron theories reflecting the alternative (but at the same time dual) pictures of baryons: baryons as chiral (topological) solitons of the meson fields and as bound states of quarks and diquarks. It is demonstrated that these two pictures describe only two sides of the same medal.

Effective hadron theory of QCD - ScienceDirect
Hadron physics : effective theories of low energy QCD : Second International Workshop on Hadron Physics, Coimbra, Portugal 25-29 September 2002 Open All Close All type

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In this regard the application of effective ?eld theory (EFT) ideas to the theoretical exploration of molecular states has been indeed a welcomed addition. The study of hadronic molecules began as an offspring of nuclear physics. The most systematic attempts to understand them have been indeed based on nuclear physics, including

Heavy hadron molecules in effective field theory: the ...
Effective Field Theories in Nuclear and Hadron Physics Vadim Lensky Theoretical Physics Group, The University of Manchester January 11, 2013 V. LenskyEFTs in Hadron and Nuclear Physics1

Effective Field Theories in Nuclear and Hadron Physics
We review recent advances in the understanding of the Quantum Chromodynamics (QCD) transition and its nature, paying special attention to the analysis of chiral symmetry restoration within different approaches based on effective theories. After presenting some of the main aspects of the current knowledge of the phase diagram from the theoretical, experimental and lattice sides, we discuss some ...

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Hadron Physics: Effective Theories of Low Energy QCD ...
The tools that we use and develop are again dispersion theory and effective field theories, e.g. chiral perturbation theory. One driving force of hadron physics is the close contact between experiment and theory by competing and supporting each other in the endeavor to reach a higher accuracy in the theoretical and experimental determination of observables and, in general, to obtain a better understanding of the structure of hadrons.

Theoretical Hadron Physics - Department of Physics and ...
University of Notre Dame. (2016, January 8). Physicists offer theories to explain mysterious collision at Large Hadron Collider. ScienceDaily. Retrieved July 8, 2020 from www.sciencedaily.com ...

Physicists offer theories to explain mysterious collision ...
But the capability of the immense LHC is the culmination of the work of leading figures in particles physics dating back almost 100 years. ... also known as the Large Hadron ... Some theories of ...

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Hadron physics - UV
High Energy Physics - Phenomenology. arXiv:2011.07900 ... We review the basic idea, the tools that have been developed as well as the resulting theories in which successful reduction of couplings has been achieved so far. ... we present a number of benchmark scenarios for each model and investigate their observability at existing and future ...

[2011.07900] Probing Unified Theories with Reduced ...
Theoretical Hadron Physics The working group researches different fields of high-energy physics: from quantum chromo dynamics (QCD) as the theory of hadrons to models of the fundamental interactions. In our current research, we focus on the investigation of non-perturbative effects of QCD.

Hadron Physics - physik.ruhr-uni-bochum.de
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Hadron Physics: Effective Theories of Low Energy QCD ...
Hadron physics effective theories of low energy QCD, Coimbra, Portugal, September 1999 0 Ratings 0 Want to read; 0 Currently reading; 0 Have read; This edition published in 2000 by American Institute of Physics in Melville, N.Y. Written in English — 410 pages This edition doesn't have a description yet. ...

Hadron physics (2000 edition) | Open Library
In physics, an effective field theory is a type of approximation, or effective theory, for an underlying physical theory, such as a quantum field theory or a statistical mechanics model. An effective field theory includes the appropriate degrees of freedom to describe physical phenomena occurring at a chosen length scale or energy scale, while ignoring substructure and degrees of freedom at ...

New theories are explored and discussed on establishing relations between the fundamental theory of strong interactions, known as QCD, and experiment. Powerful theoretical models, known as effective theories, based on symmetries of QCD, have been developed to address the non-perturbative regime of QCD in an approximate, yet quantitatively controllable way. The present workshop focussed on the most recent developments in this area. New results on meson and baryon physics are discussed as well and new directions towards the possible experimental confirmation of nuclear/quark matter and quark-gluon plasma are indicated.

The study of hadrons unites a variety of theoretical approaches, ranging from low-energy QCD dynamics, chiral perturbation theory, and meson and baryon phenomenology, to the effects of hot and dense nuclear matter. Fruitful crosslinks between these topics had become clear in the recent past. These proceedings form a coherent overview of the actual state of low-energy hadron physics.

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Effective Field theory is a powerful framework based on controlled expansions for problems with a natural separation of energy scales. This technique is particularly important for QCD, the theory of strong interactions, due to the vast diversity of phenomena that it describes. Stewart and collaborators have invented a new class of effective theories that can be used in processes with energetic hadrons. These Soft-Collinear Effective Theories provide a unified framework for describing hadronic processes which involve hard probes or the release of a large amount of energy. Many interesting issues about hadronic physics can be addressed with the soft-collinear effective theory. Examples include the size and shape of hadronic form factors, the universality of hadronic distribution functions for a plethora of processes, and the importance of subleading corrections at intermediate energy scales. Effective field theories allow these issues to be addressed using only the underlying symmetries and scales in QCD. Understanding these issues also has a direct impact on other areas of physics, such as on devising clean methods for the measurement of CP violation in the decay of B-mesons. Current progress on the soft-collinear effective theory and related methods is discussed in this report.

The study of QCD in the confinement regime poses some of the most difficult problems of fundamental physics at present. The mechanism of confinement itself is not described formally, and it is hard to investigate the properties of the fundamental theory in the determination of the structures and interactions of hadronic systems. The strong coupling and the extreme non-linearity of the theory severely limit the applicability and the extension and generalization of models and methods. The area of particle/nuclear physics called Hadron Physics deals with the phenomena determined by the confinement regime of QCD.The International Workshop on Hadron Physics 98 aimed to provide a framework for the comparative evaluation of different approaches to the difficult problems of QCD, and gathered together experts who have been leading developments in hadronic physics in recent years. As a central feature of the workshop program, there were four sets of lectures: (1) “An Introduction to Effective Field Theory” (J F Donoghue); (2) “Non-perturbative QCD” (A Di Giacomo); (3) “Diffraction: Past, Present and Future” (E Predazzi); “QCD at High Temperature and Density” (T Hatsuda). These courses provided a pedagogical and updated account of the recent developments that gave support to the discussion of frontier research problems. The lecturers did very useful work in the review and description of important lines of research.The lectures are reproduced in this book, together with invited talks and contributed papers dealing with specific research problems, for the use and appreciation of a wider audience.

Particle and nuclear physicists frequently take results from Lattice QCD at their face value without probing into their reliability or sophistication. This attitude usually stems from a lack of knowledge of the field. The aim of the present volume is to rectify this by introducing in an elementary way several topics, which we believe are appropriate for, and of possible interest to, both particle and nuclear physicists who are non-experts in the field. Contents:Meson and Baryon Spectroscopy on a Lattice (C McNeile)Exotics (C Michael)Two Quark Potentials (G Bali)Interactions between Lattice Hadrons (H R Fiebig & H Markum)Bridges from Lattice QCD to Nuclear Physics (A M Green) Readership: Researchers, advanced undergraduates, graduate students in nuclear and particle physics. Keywords:Lattice Quantum Chromodynamics/Lattice QCD;Meson and Baryon Spectroscopy;Quark Exotic StatesKey Features:Several of the authors give elementary introductions that lead to some duplication. This we believe is a positive feature, since each author presents a different viewpoint emphasizing the particular topic of that chapterThe topics chosen are the closest Lattice QCD comes to more conventional particle and nuclear physicsThe numerical results presented in the various chapters are up-to-date as of late 2003

This volume of the International School of Physics Enrico Fermi is dedicated to Valerio Filippini. He devoted his life to physics. Valerio Filippini was born in Somma Lombardo (Milano) on December 8, 1958. He obtained the Master Degree in Physics at the University of Pavia in 1982, cum laude. After a working parenthesis at an industrial firm, he became Research Physicist of INFN, Sezione di Pavia, in 1988 and was promoted Senior Research Physicist in 1993. He participated to the experiments PS 179 (TOFRADUPP) and PS 201 (Obelix) at LEAR (CERN), FINUDA at LNF and ATHENA at AD (CERN). His outstanding scientific contributions were provided in the OBELIX and FINUDA experiments. Nobody could compete with Filippini in exploiting at best the daily-evoluting performances of the computing tools for the needs of the experiments, both for on-line and off-line purposes. The FINUDA experiment collected physics data immediately after the roll-in thanks to the reliability and simplicity of the on-line system designed and assembled by the physicist. However, he was not only a 'Clavier Physicist' but a complete Scientist: he also leaded the Pavia Group in designing and providing advanced detectors, and in developing mathematical methods for the analysis of the data. His scientific contributions are documented by about 90 publications on refereed international journals, about 100 contributions to International Conferences and Workshops, and 3 invited talks.

This book presents a recent survey of the advances in hadron physics. The main topics are nonperturbative high energy processes in QCD, deep inelastic scattering and perturbative QCD, RHIC and quark-gluon plasma physics and effective theories for low energy QCD.The book contains four series of lectures written in a pedagogical style and a number of short papers on the main subject. They will benefit researchers who want

to be familiar with the frontiers of hadron physics and its connection with the large experimental programs under development in laboratories such as the Relativistic Heavy Ion Collider (RHIC) and the Thomas Jefferson National Laboratory.

This volume brings together many contributions from leading research scientists, engineers and practitioners in computer science. Selected by program committee members, the topics describe innovative research and new technologies in the following areas of interest: image processing, computer vision and pattern recognition; computational linguistics and natural language processing; artificial intelligence, machine learning and algorithms; software engineering; computer networks and security; and bioinformatics.