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Nuclear Dynamics: From Quarks to Nuclei Apr 06 2021 Papers presented at the 20th CFIF fall workshop held in Lisbon, Portugal, in October/November 2002. The focus of these papers is on the latest experimental observations and on theoretical progress made in the fields of few-nucleon dynamics and related problems. The topics range from electron-nucleus scattering, meson production, relativistic effects, structure of nucleons and of light nuclei, to heavy-ion collisions.

Progress of Bep Treatments on Nb at JLAB. Jan 03 2021 Recent experimental results have indicated that Buffered Electropolishing (BEP) is a promising candidate for the next generation of surface treatment technique for Nb superconducting radio frequency (SRF) cavities to be used in particle accelerators. In order to lay the foundation for using BEP as the next generation surface treatment technique for Nb SRF cavities, some fundamental aspects of BEP treatments for Nb have to be investigated. In this report, recent progress on BEP study at JLab is shown. Improvements on the existing vertical BEP are made to allow water cooling from outside of a Nb single cell cavity in addition to cooling provided by acid circulation so that the temperature of the cavity can be stable during processing. Some investigation on the electrolyte mixture was performed to check the aging effect of the electrolyte. It is shown that good polishing results can still be obtained on Nb at a current density of 171 mA/cm when the BEP electrolyte was at the stationary condition and was more than 1.5 years old.

Science Requirements and Conceptual Design for a Polarized Medium Energy Electron-Ion Collider at Jlab Feb 16 2022 Researchers have envisioned an electron-ion collider with ion species up to heavy ions, high polarization of electrons and light ions, and a well-matched center-of-mass energy range as an ideal gluon microscope to explore new frontiers of nuclear science. In its most recent Long Range Plan, the Nuclear Science Advisory Committee (NSAC) of the US Department of Energy and the National Science Foundation endorsed such a collider in the form of a 'half-recommendation.' As a response to this science need, Jefferson Lab and its user community have been engaged in feasibility studies of a medium energy polarized electron-ion collider (MEIC), cost-effectively utilizing Jefferson Lab's already existing Continuous Electron Beam Accelerator Facility (CEBAF). In close collaboration, this community of nuclear physicists and accelerator scientists has rigorously explored the science case and design concept for this envisioned grand instrument of science. An electron-ion collider embodies the vision of reaching the next frontier in Quantum Chromodynamics - understanding the behavior of hadrons as complex bound states of quarks and gluons. Whereas the 12 GeV Upgrade of CEBAF will map the valence-quark components of the nucleon and nuclear wave functions in detail, an electron-ion collider will determine the largely unknown role sea quarks play and for the first time study the glue that binds all atomic nuclei. The MEIC will allow nuclear scientists to map the spin and spatial structure of quarks and gluons in nucleons, to discover the collective effects of gluons in nuclei, and to understand the emergence of hadrons from quarks and gluons. The proposed electron-ion collider at Jefferson Lab will collide a highly polarized electron beam originating from the CEBAF recirculating superconducting radiofrequency (SRF) linear accelerator (linac) with highly polarized light-ion beams or unpolarized light- to heavy-ion beams from a new ion accelerator and storage complex. Since the very beginning, the design studies at Jefferson Lab have focused on achieving high collider performance, particularly ultrahigh luminosities up to 1034 cm?2s?1 per detector with large acceptance, while maintaining high polarization for both the electron and light-ion beams. These are the two key performance requirements of a future electron-ion collider facility as articulated by the NSAC Long Range Plan. In MEIC, a new

ion complex is designed specifically to deliver ion beams that match the high bunch repetition and highly polarized electron beam from CEBAF. During the last two years, both development of the science case and optimization of the machine design point toward a medium-energy electron-ion collider as the topmost goal for Jefferson Lab. The MEIC, with relatively compact collider rings, can deliver a luminosity above 1034 cm?2s?1 at a center-of-mass energy up to 65 GeV. It offers an electron energy up to 11 GeV, a proton energy up to 100 GeV, and corresponding energies per nucleon for heavy ions with the same magnetic rigidity. This design choice balances the scope of the science program, collider capabilities, accelerator technology innovation, and total project cost. An energy upgrade could be implemented in the future by adding two large collider rings housed in another large tunnel to push the center-of-mass energy up to or exceeding 140 GeV. After careful consideration of an alternative electron energy recovery linac on ion storage ring approach, a ring-ring collider scenario at high bunch repetition frequency was found to offer fully competitive performance while eliminating the uncertainties of challenging R & D on ampere-class polarized electron sources and many-pass energy-recovery linacs (ERLs). The essential new elements of an MEIC facility at Jefferson Lab are an electron storage ring and an entirely new, modern ion acceleration and storage complex. For the high-current electron collider ring, the upgraded 12 GeV CEBAF SRF linac will serve as a full-energy injector, and, if needed, provide top-off refilling. The CEBAF fixed-target nuclear physics program can be simultaneously operated since the filling time of the electron ring is very short. The ion complex for MEIC consists of sources for polarized light ions and unpolarized light to heavy ions, an SRF ion linac with proton energy up to 280 MeV, a 3 GeV prebooster synchrotron, a large booster synchrotron for proton energy up to 20 GeV, and a medium-energy collider ring with energy up to 100 GeV. The ion complex can accelerate other species of ions with corresponding energies at each accelerating stage. There are three collision points planned for MEIC. Two of them are for collisions with medium-energy ions; the third is for low energy ion beams stored in a dedicated low-energy compact storage ring, as a possible follow-on project.

The JLab 12 GeV Energy Upgrade of CEBAF for QCD and Hadronic Physics Jul 09 2021 CEBAF at Jefferson Lab is a 5-pass, recirculating cw electron linac operating at ~6 GeV and devoted to basic research in nuclear physics. The 12 GeV Upgrade is a major project, sponsored by the DOE Office of Nuclear Physics, that will expand its research capabilities substantially by doubling the maximum energy and adding major new experimental apparatus. We anticipate that the project will receive Critical Decision 2 approval this year and begin construction in 2008. The research program motivating the Upgrade includes: the study of hybrid mesons, which involve excited states of the glue, to explore the nature of quark confinement; dramatic improvements in our understanding of the QCD structure of the hadrons through the extension of our knowledge of their parton distribution functions to high xBjorken, where they are dominated by underlying valence quark structure, and a program of nucleon "tomography" via measurements of the Generalized Parton Distributions (GPDs), a broad program of experiments in the physics of nuclei that aims to understand the QCD basis for the nucleon-nucleon force and how nucleons and mesons arise as an approximation to the underlying quark-gluon structure; and precision tests of the Standard Model through parity violating deep inelastic and Møller scattering. The Upgrade includes: doubling the accelerating voltages of the linacs by adding 10 new high-performance cryomodules; the requisite expansion of the 2K cryogenics plant and rf power systems to support these cryomodules; upgrading the beam transport system from 6 to 12 GeV through extensive re-use and/or modification of existing hardware; and the addition of one recirculation arc, a new experimental area, and the beamline to it; and the construction of major new experimental equipment for the GPD, high-xBjorken, and hybrid meson programs. The presentation will describe the science briefly and provide some details about the accelerator plans.

Energy from Nuclear Fission Jun 20 2022 This book provides an overview on nuclear physics and

energy production from nuclear fission. It serves as a readable and reliable source of information for anyone who wants to have a well-balanced opinion about exploitation of nuclear fission in power plants. The text is divided into two parts; the first covers the basics of nuclear forces and properties of nuclei, nuclear collisions, nuclear stability, radioactivity, and provides a detailed discussion of nuclear fission and relevant topics in its application to energy production. The second part covers the basic technical aspects of nuclear fission reactors, nuclear fuel cycle and resources, safety, safeguards, and radioactive waste management. The book also contains a discussion of the biological effects of nuclear radiation and of radiation protection, and a summary of the ten most relevant nuclear accidents. The book is suitable for undergraduates in physics, nuclear engineering and other science subjects. However, the mathematics is kept at a level that can be easily followed by wider circles of readers. The addition of solved problems, strategically placed throughout the text, and the collections of problems at the end of the chapters allow readers to appreciate the quantitative aspects of various phenomena and processes. Many illustrations and graphs effectively supplement the text and help visualising specific points.

Government Research Directory Apr 25 2020

N* Physics and Nonperturbative Quantum Chromodynamics Oct 24 2022 The Workshop N* Physics and non-perturbative QeD was held at the Eu ropean Center for Theoretical Studies and Related Areas (ECT*) in Trento, Italy, during May 18-29, 1998. Previous workshops of the series on N* Physics took place at the Florida State University (1994), at CEBAF (1995), at the Institute for Nuclear Theory in Seattle (1996) and at the George Washington University (1997). The Workshop was devoted to a summary of recent experimental and the oretical research on N* phsyics and special emphasis was given to the infor mation that photo-and electro-production of nucleon resonances can provide on the non-perturbative regime of Quantum Chromodynamics. The idea was to stimulate discussions among experimentalists and theoreticians in order to pursue the interpretation of the huge amount of forthcoming data from several laboratories in the world. It was therefore decided to have both experimental and theoretical lectures on the main topics, like ,among the others, single and double pion production, TJ-and K-meson production, the GDH sum rule, the spin of the proton, etc. Thanks to the unusual two-week extension of the Work shop, the allotted time for the lectures was extended up to one hour in order to allow the invited lecturers to give a detailed presentation of their topics. Fi nally, various short contributions were selected to sharpen the discussion about selected items.

An Overview of Longitudinal Spin Structure Measurements from JLab Feb 04 2021 Jefferson Lab is currently one of the facilities leading the investigation of the spin structure of the nucleon. Over the past 15 years, several high precision measurements have been completed, extending our knowledge of the polarized structure functions g1 and g2 down to Q2 = 0.02 GeV2. In particular, the low-Q2 range (? 0.1 GeV2) from these data allows us to make a benchmark-check of Chiral Perturbation theory ([chi]PT). Previous results for the moments of the spin structure functions in this region have shown mixed agreement. For [Gamma]1, the first moment of g1, we find good consistency between data and theory. However, we have seen a surprisingly large discrepancy with [chi]PT calculations for the [delta]{sub LT} spin polarizability on the neutron, which is significantly less sensitive to the [Delta]-resonance contribution. These proceedings will discuss the recent experimental effort at low Q2 from Jefferson Lab, including a discussion of preliminary results on the neutron. The new results on the neutron still show a sizeable discrepancy between data and theory. However, new calculations show improved agreement with data for some observables. In addition, new proton data for g2 is also expected to help resolve the disagreement for [delta]{sub LT}.

Few-Body Problems in Physics May 19 2022

Commerce Business Daily May 07 2021

The Science Reports of the T?hoku University Jul 21 2022 Includes Annual reports for the Physics and

Astronomy Departments.

From Parity Violation to Hadronic Structure and more Feb 22 2020 This book contains the proceedings of the third international workshop on From Parity Violation to Hadronic Structure and More. The many applications of parity violation are way beyond the scope of what Lee and Yang could have imagined fifty years after their proposal. For the physics topics discussed during this workshop, the application of parity violation has become a standard work horse allowing for the extraction of many physics topics in different experiments.

Exclusive Processes at High Momentum Transfer Mar 25 2020 This book focuses on the physics of exclusive processes at high momentum transfer and their description in terms of generalized parton distributions, perturbative QCD, and relativistic quark models. It covers recent developments in the field, both theoretical and experimental. Contents: Perspectives on Exclusive Processes in QCD (S J Brodsky); High-t Meson Photo- and Electroproduction: A Window on Partonic Structure of Hadrons (J-M Laget); Nucleon Hologram with Exclusive Leptoproduction (A Belitsky & D Muller); QCD Factorization for the Pion Diffractive Dissociation into Two Jets (D Yu Ivanov); GPDs, Form Factors and Compton Scattering (P Kroll); Real Compton Scattering from the Proton (A Nathan); Resonance Exchange Contributions to Wide-Angle Compton Scattering: The D-Term (T Oppermann); Proton-Antiproton Annihilation into Two Photons at Large s (C Weiss); Quark--Hadron Duality Studies at Jefferson Lab; An Overview of New and Exisiting Results (C Keppel); Novel Hard Semiexclusive Processes and Color Singlet Clusters in Hadrons (M Strikman et al.); and other papers. Readership: Theoretical and experimental researchers in nuclear and elementary particle physics.

Beam Halo Measurements at UMER and the JLAB FEL Using an Adaptive Masking Method May 27 2020 Beam halo is a challenging issue for intense beams since it can cause beam loss, emittance growth, nuclear activation and secondary electron emission. Because of the potentially low number of particles in the halo compared with beam core, traditional imaging methods may not have sufficient contrast to detect faint halos. We have developed a high dynamic range, adaptive masking method to measure halo using a digital micro-mirror array device and demonstrated its effectiveness experimentally on the University of Maryland Electron Ring (UMER). We also report on similar experiments currently in progress at the Jefferson Lab Free Electron Laser (FEL) using this method.

Dynamical Coupled-channels Study of Meson Production Reactions from EBAC@Jlab Nov 25 2022 We present the current status of a combined and simultaneous analysis of meson production reactions based on a dynamical coupled-channels (DCC) model, which is conducted at Excited Baryon Analysis Center (EBAC) of Jefferson Lab.

Great Jobs for Engineering Majors Jul 29 2020 Provides information about jobs for engineering majors. Gives job searching techniques and possible career paths in industry, consulting, government, and education.

Second Workshop on the Investigation and Reporting of Incidents and Accidents, IRIA 2003 Mar 17 2022

Hard Exclusive Reactions at Jlab Dec 02 2020 Dedicated experiments to study Deeply Virtual Compton Scattering (DVCS) and Deeply Virtual Meson Production (DVMP) have been carried out at Jefferson Lab. DVCS helicity--dependent and helicity--independent cross sections and beam spin asymmetries have been measured, as well as cross sections and asymmetries for the $\pi0?$, η, $\rho0?$, $\rho+?$, ω and ϕ for exclusive electroproduction. The data were taken in a wide kinematic range in $Q2?$=1--4.5 GeV$2?$, x_B=0.1--0.5, and $

Studies of Resistive Wall Heating at JLAB FEL. Apr 30 2023 When the JLAB FEL is under CW operation, it had been observed that temperature rises over the wiggler vacuum chamber, presumably as the result of the power deposition on the resistive wall of the wiggler chamber. Previous analyses have

been done on the resistive wall impedance for various cases, such as DC, AC, and anomalous skin effects*. Here we report an investigation on the beam kinetic energy losses for each of these cases. This study includes the non-ultrarelativistic effect on resistive wall loss, for both round pipe and parallel plates. We will present the comparison of our results with the measured data obtained during CW operation of the JLAB FEL. Other possible factors contributing to the measured heating will also be discussed.

Perspectives In Hadronic Physics - Proceedings Of The Second International Conference Jan 15 2022 This volume discusses theoretical and experimental activities in the investigation of nucleon and nuclear structure by electromagnetic and hadronic probes at intermediate and high energies. The focus is on laboratory activities, recent progress concerning the structure of hadrons, relativistic many-body approaches, deep inelastic scattering and correlations in nuclei.

Proceedings of The IX International Conference on Hypernuclear and Strange Particle Physics Sep 11 2021 This volume contains the proceedings of the IX International Conference on Hypernuclear and Strange Particle Physics (HYP 2006). This conference series is devoted to the progress of our knowledge about strangeness flavor in hadron and nuclear physics. Besides the traditional topics such as hadron structure, hypernuclear spectroscopy and weak decay of hypernuclei, a particular focus of this conference was on the properties of strange mesons and their binding in nuclear systems.

Nuclear Instruments & Methods in Physics Research Feb 28 2023

EXA 2011 Jan 27 2023 Proceedings of the International Conference on Exotic Atoms and Related Topics (EXA 2011) held in Vienna, Austria, September 5-9, 2011 E.Widmann and O. Hartmann (Eds) Now the research in exotic atoms has a remarkable history of more than 50 years. Enormous success in the understanding of fundamental interactions and symmetries resulted from the research on these tiny objects at the femtoscale. This volume contains research papers on recent achievements and future opportunities of this highly interdisciplinary field of atomic, nuclear, and particle physics. The Proceedings are structured according to the conference session topics: Kaon-Nucleus and Kaon-Nucleon Interactions, Antihydrogen and Fundamental Symmetries, Hadronphysics with Antiprotons, Future Facilities and Instrumentation, Low energy QCD. Reprint from Hyperfine Interactions vol. 209, 210 and 211.

Baryons 2002 Aug 22 2022 This book deals with the latest developments in the area of three-quark systems. Emphasis is given to the discussion of new experimental results in the areas of form factors, unpolarized and polarized structure functions, and baryon structure and spectroscopy. Of particular interest are the new theoretical developments in the area of generalized parton distributions and lattice quantum chromodynamics.

Science Oct 12 2021

Lepton Scattering, Hadrons and QCD Dec 14 2021 This volume is centered on recent developments in the exploration of hadronic structure through lepton scattering, in the description of hadron physics directly from lattice QCD and non-perturbative QCD models, and in efforts to strengthen the links between these activities. Specific topics that are covered include: parton distribution functions, polarized structure functions, generalized structure functions, nuclear effects, quark-hadron duality, electromagnetic form factors, structure functions and hadron properties from lattice QCD, and QCD models based on the Dyson–Schwinger equations. Contents:Partonic Structure of Hadrons:Chiral Extrapolation of Lattice Structure Function Calculations (W Detmold)Exclusive Processes at HERMES (N Bianchi)Soft Pion Production Associated with Deeply Virtual Compton Scattering (L Mosse)Spin Structure of Hadrons:Polarized Structure Functions in QCD (J Kodaira)Single Spin Asymmetries and Quark Fragmentation (M Anselmino et al.)Perturbative — Nonperturbative QCD Transition:Lepton Scattering and Quark-Hadron Duality Studies at Jlab (R Ent)Estimating Low Energy Model Parameters

from Deep Inelastic Scattering (L P Hoyt & A I Signal)Form Factors:Physical Hadron Properties from Lattice Data at Large Quark Masses (A W Thomas)Electromagnetic Interactions in Light Front Dynamics (J -F Mathiot)Nucleon Form Factors in the Covariant Diquark-Quark Model (R Alkofer & M Oettel)Hadron Excitations, Confinement and Chiral Symmetry Breaking:Experimental Studies of the Hadron Spectrum (J Napolitano)The Character of Goldstone Bosons (M B Hecht et al.)Deconfining by Winding (R Hofmann)Small-x Physics and Nuclear Medium Effects:Leading Nucleon Production at HERA (G Levman)Nuclear Medium Effects at HERMES (P di Nezza)Physics Motivation for a Polarized Electron-Ion Collider (J M Cameron & J T Londergan)and other papers Readership: Theoretical and experimental researchers in nuclear and high energy physics. Keywords:

Ultrafast Lasers for Materials Science Aug 10 2021 Kelley (Jefferson Lab, US), Kreutz (U. of Technology Aachen, Germany), Li (Panasonic Boston Laboratory, US), and Pique (Naval Research Laboratory, US) present 29 papers from the November/December 2004 Materials Research Society symposium of the same name, organized with the goal of bringing together researchers exploring the use of ultrafast lasers for materials synthesis, processing, and analysis. The sessions of the symposium covered fundamental science and technology of ultrafast lasers, materials characterization, laser ablation and deposition, micromachining and nanostructuring, synthesis of nanoparticles and nanowiries, and direct-writing of waveguides in transparent materials. Specific topics selected from the ten invited papers include phase change mechanisms in pulsed laser-matter interaction, high power THz generation form sub- ps bunches of relativistic electrons, micro- and nano-structured optical fibers as artificial media for amplification of light, modification and color markings in glasses by UV laser radiation, and generation of new nanomaterials by interfering femtosecond laser processing. Annotation :2005 Book News, Inc., Portland, OR (booknews.com).

Study of Nucleon Resonances at EBAC@Jlab Sep 23 2022 We present the dynamical origin of the P11 nucleon resonances resulting from a dynamical coupled-channels (DCC) analysis of meson production reactions off a nucleon target, which is conducted in Excited Baryon Analysis Center (EBAC) at Jefferson Lab. Two resonance poles are found in the energy region where the Roper resonance P11(1440) is supposed to be observed. Furthermore, the two resonance poles and the next higher resonance pole corresponding to P11(1710) are found to originate from a single bare state.

Electromagnetic Interactions in Nuclear and Hadron Physics Jan 23 2020 This book covers the following topics: (1) meson and hadron production by real and virtual photon interaction with nucleons and nuclei; (2) astrophysical studies via photoreactions and hadron reactions; (3) new technologies for the electromagnetic probes and detector development; (4) nuclear structure studies with electromagnetic probes; (5) fundamental symmetries with electromagnetic probes and related problems. The proceedings have been selected for coverage in: • Index to Scientific & Technical Proceedings (ISTP CDROM version / ISI Proceedings) Contents:Search for New Baryon Resonances (B Saghai & Z Li)Overview of Laser-Electron Photon Facility at SPring-8 (T Nakano)Weak Nucleon Form Factors (P A Souder)High Energy Approaches to Low Energy Phenomena in Astrophysics (S M Austin)Photo-Nuclear Reactions in the Big-Bang and Supernovae (T Kajino et al.)Transition Properties of Low-Lying Resonances in a Relativistic Quark Model with a Meson Cloud Effect (Y B Dong et al.)Weak Interaction, Giant Resonances and Nuclear Astrophysics (K Langanke & G Martínez-Pinedo)Electroproduction of Strange Nuclei (E V Hungerford)Photonuclear Reactions of Light Nuclei and Few-Body Problems (T Shima et al.)On Use of Quark–Hadron Duality in Photoabsorption Sum Rules (S B Gerasimov)Chiral Symmetry and Hadron Properties in Lattice QCD (A W Thomas)Photoproduction Experiments with Polarized HD Targets (S Bouchigny et al.)Development of a Compact Photon Detector for ANKE at COSY Julich (H Büscher et al.)and other papers Readership: Graduate students and researchers in nuclear physics. Keywords:

Spin Structure with JLab 6 and 12 GeV. Jun 08 2021 Highlights of JLab 6 GeV results on spin structure study and plan for 12 GeV program. Spin structure study is full of surprises and puzzles. A decade of experiments from JLab yield these exciting results: (1) valence spin structure; (2) precision measurements of g2/d2 - high-twist; (3) spin sum rules and polarizabilities; and (4) first neutron transversity. There is a bright future as the 12 GeV Upgrade will greatly enhance our capability: (1) Precision determination of the valence quark spin structure flavor separation; (2) Precision measurements of g2/d2; and (3) Precision extraction of transversity/tensor charge.

Hypernuclear Spectroscopy with Electron Beam at JLab Hall C. Jun 27 2020 Hypernuclear spectroscopy with electron beam at JLab Hall C has been studied since 2000. The first experiment, JLab E89-009, used Short Orbit Spectrometer (SOS) as a kaon arm and a split-pole type spectrometer (ENGE) as an electron arm. E89-009 employed zero-degree tagging method, which tags scattered electrons at zero-degree and the kaon arm also covered zero-degree. This method obtains maximum yield of hypernuclei but sufferers from high rate background of electrons from bremsstrahlung and positrons from pair-creation. Nevertheless, this experiment demonstrated the possibility of the (e, e' K) reaction for hypernuclear spectroscopy by obtaining a hypernuclear mass spectrum with an energy resolution of better than 1 MeV (FWHM) [1][2]. However, poor signal to noise ratio and poor statistics requires us to improve the experimental setup. Therefore, E01-011 experiment was proposed based on the success of the JLab E01-011 experiment. Improvements of E01-011 from E09-009 can be summarized as: 1. Employed newly constructed high resolution kaon spectrometer (HKS) as a kaon arm. 2. Employed so-called 'tilt-method' for the electron arm. With the newly constructed HKS, having 2-10-4 momentum resolution, we expect an energy resolution of 400 keV (FWHM). The 'tilt-method' means the electron arm is tilted vertically to the splitter dispersive plane to avoid background electrons from bremsstrahlung and moeller scattering. The setup allowed us to use up to a few tens beam. The experiment was performed in 2005 and final result will be shown shortly. The third experiment, JLab E05-115 experiment was proposed as a natural extension of E01-011 experiment and will be performed in 2009. Improvements of experimental setup are, 1. Employed newly constructed high resolution electron spectrometer (HES) as a electron arm, 2. Employed a new charge-separation magnet (Splitter), fully customized for hypernuclear experiment at Hall C. With the third generation experimental setup, we can study variety of targets up to medium-heavy ones such as 52Cr. This talk mainly focuses on the current status of the E05-115 experiment.

CERN Courier Mar 05 2021

The impact of spending cuts on science and scientific research Mar 29 2023 The pressure to be seen to be making cuts across the public sector is threatening to undermine both the Government's good record on investment in science and the economic recovery. Whilst the contribution of a strong domestic science base is widely acknowledged, methodological problems with quantifying its precise value to the economy mean that it is in danger of losing out in Whitehall negotiations. Scientists are under increasing pressure to demonstrate the impact of their work and there is concern that areas without immediate technology applications are being undervalued. The Committee believes the Government faced a strategic choice: invest in areas with the greatest potential to influence and improve other areas of spending, or make cuts of little significance now, but that will have a devastating effect upon British science and the economy in the years to come.

International Workshop on Positrons at Jefferson Lab Dec 26 2022 This 3 day workshop explored how one might create a beam of positrons and the requirements of such a source. In the case of high energy positrons at accelerator facilities, the theoretical and experimental motivation for experiments aimed at studying the structure and interaction of subatomic particles using high energy positrons were presented. Alternatively, the application of low energy positrons to study atomic systems or material

properties was also discussed.

Basic Ideas and Concepts in Nuclear Physics Apr 18 2022 The third edition of a classic book, Basic Ideas and Concepts in Nuclear Physics sets out in a clear and consistent manner the various elements of nuclear physics. Divided into four main parts: the constituents and characteristics of the nucleus; nuclear interactions, including the strong, weak and electromagnetic forces; an introduction to nuclear structure; and recent developments in nuclear structure research, the book delivers a balanced account of both theoretical and experimental nuclear physics for students studying the topic. In addition to the numerous revisions and updates to the previous edition to capture the developments in the subject over the last five years, the book contains a new chapter on the structure and stability of very light nuclei. As with the previous edition the author retains a comprehensive set of problems and the book contains an extensive and well-chosen set of diagrams. He keeps the book up to date with recent experimental and theoretical research, provides mathematical details as and when necessary, and illustrates topics with box features containing examples of recent experimental and theoretical research results.

Hadron Spectroscopy And Structure - Proceedings Of The Xviii International Conference Aug 30 2020 This is the conference proceedings for the 18th International Conference on Hadron Spectroscopy and Structure (HADRON2019), held in Guilin, China. It is among the most important conference series in the field of hadron spectroscopy and structure. Collecting more than 130 contributions from this conference, the book spans over the topics of meson and baryon spectroscopy, exotic hadrons, hadron production and interactions, analysis tools, QCD and hadron structure, hadrons in nuclear environment and hypernuclei. Summaries of the recent discoveries from Belle, BESIII, LHCb and other high-energy experiments, as well as recent theoretical developments in the above mentioned topics, are contained in this volume, rendering it as a valuable resource for researchers working on hadron spectroscopy and structure.

Reviews of Accelerator Science and Technology Nov 01 2020 This book is dedicated to superconducting technology and its applications, including superconducting magnets (SC magnets) and superconducting radio-frequency (SRF) cavities.

Reviews of Accelerator Science and Technology Sep 30 2020 Over the past several decades major advances in accelerators have resulted from breakthroughs in accelerator science and accelerator technology. After the introduction of a new accelerator physics concept or the implementation of a new technology, a leap in accelerator performance followed. A well-known representation of these advances is the Livingston chart, which shows an exponential growth of accelerator performance over the last seven or eight decades. One of the breakthrough accelerator technologies that support this exponential growth is superconducting technology. Recognizing this major technological advance, we dedicate Volume 5 of Reviews of Accelerator Science and Technology (RAST) to superconducting technology and its applications. Two major applications are superconducting magnets (SC magnets) and superconducting radio-frequency (SRF) cavities. SC magnets provide much higher magnetic field than their room-temperature counterparts, thus allowing accelerators to reach higher energies with comparable size as well as much reduced power consumption. SRF technology allows field energy storage for continuous wave applications and energy recovery, in addition to the advantage of tremendous power savings and better particle beam quality. In this volume, we describe both technologies and their applications. We also include discussion of the associated R&D in superconducting materials and the future prospects for these technologies. Contents:Overview of Superconductivity and Challenges in Applications (Rene Flükiger)Superconducting Materials and Conductors: Fabrication and Limiting Parameters (Luca Bottura and Arno Godeke)Superconducting Magnets for Particle Accelerators (Lucio Rossi and Luca Bottura)Superconducting Magnets for Particle Detectors and Fusion Devices (Akira Yamamoto and Thomas Taylor)Superconducting Radio-Frequency

Fundamentals for Particle Accelerators (Alex Gurevich)Superconducting Radio-Frequency Systems for High-? Particle Accelerators (Sergey Belomestnykh)Superconducting Radio-Frequency Cavities for Low-Beta Particle Accelerators (Michael Kelly)Cryogenic Technology for Superconducting Accelerators (Kenji Hosoyama)Superconductivity in Medicine (Jose R Alonso and Timothy A Antaya)Industrialization of Superconducting RF Accelerator Technology (Michael Peiniger, Michael Pekeler and Hanspeter Vogel)Superconducting Radio-Frequency Technology R&D for Future Accelerator Applications (Charles E Reece and Gianluigi Ciovati)Educating and Training Accelerator Scientists and Technologists for Tomorrow (William Barletta, Swapan Chattopadhyay and Andrei Seryi)Pursuit of Accelerator Projects at KEK in Japan (Yoshitaka Kimura and Nobukazu Toge) Readership: Physicists and engineers in accelerator science and industry. Keywords:Particle Accelerators;Superconducting;Superconducting Materials;Superconducting TechnologyReviews: “This latest volume looks at the role of superconductivity in particle accelerators and how this intriguing phenomenon has been harnessed in the pursuit of ever-increasing beam energy or intensity. It also considers the application of superconducting technology beyond the realm of accelerators, for example in medical scanners and fusion devices. As well as containing much technical detail it is also full of fascinating facts.” CERN Courier

Proceedings of the Workshop on Lepton Scattering, Hadrons and QCD Nov 13 2021 This volume is centered on recent developments in the exploration of hadronic structure through lepton scattering, in the description of hadron physics directly from lattice QCD and non-perturbative QCD models, and in efforts to strengthen the links between these activities. Specific topics that are covered include: parton distribution functions, polarized structure functions, generalized structure functions, nuclear effects, quark-hadron duality, electromagnetic form factors, structure functions and hadron properties from lattice QCD, and QCD models based on the Dyson-Schwinger equations.

An Assessment of U.S.-Based Electron-Ion Collider Science Dec 22 2019 Understanding of protons and neutrons, or "nucleons"â€"the building blocks of atomic nucleiâ€"has advanced dramatically, both theoretically and experimentally, in the past half century. A central goal of modern nuclear physics is to understand the structure of the proton and neutron directly from the dynamics of their quarks and gluons governed by the theory of their interactions, quantum chromodynamics (QCD), and how nuclear interactions between protons and neutrons emerge from these dynamics. With deeper understanding of the quark-gluon structure of matter, scientists are poised to reach a deeper picture of these building blocks, and atomic nuclei themselves, as collective many-body systems with new emergent behavior. The development of a U.S. domestic electron-ion collider (EIC) facility has the potential to answer questions that are central to completing an understanding of atoms and integral to the agenda of nuclear physics today. This study assesses the merits and significance of the science that could be addressed by an EIC, and its importance to nuclear physics in particular and to the physical sciences in general. It evaluates the significance of the science that would be enabled by the construction of an EIC, its benefits to U.S. leadership in nuclear physics, and the benefits to other fields of science of a U.S.-based EIC.