

High Energy Photon Photon Collisions At A Linear Collider

High Energy Photon-Photon Collisions at a Linear Collider High Energy Photon-photon Collisions

The proceedings of the Joint International Lepton-Photon Symposium and Europhysics Conference on High Energy Physics cover the full range of frontline research in high energy particle physics. The latest results, both theoretical and experimental, are presented and reviews of recent developments in instrumentation and accelerator techniques are included. Volume one summarises the highly specialised topics presented in the parallel sessions while the second volume contains the review talks given by the invited speakers.

TAUP 91 covers the proceedings of the Second International Workshop on Theoretical and Phenomenological Aspects of Underground Physics, held in Toledo, Spain on September 9-13, 1991. The book focuses on the processes, methodologies, reactions, and transformations involved in underground physics. The selection first offers information on the fundamental issues in particle astrophysics and an overview of the problems related to general cosmology. Topics include connections between particle physics, astrophysics, and cosmology, stellar physics and particles, astrophysical ages, cosmic background radiation, and abundances of light elements. The text also takes a look at big bang nucleosynthesis constraints on new physics and microwave background radiation. The publication ponders on very wide band interferometric gravitational wave antenna and search for stellar gravitational collapse by macro. The text also examines high energy cosmic neutrinos of acceleration and non-acceleration origin; tests of general relativity and Newtonian gravity at large distances and the dark matter problem; and nuclear form factors for the scattering of neutralinos. The selection is a valuable reference for readers interested in underground physics.

Gluino Pair Production in High-energy Photon Collisions

High Energy Photon Production in Nuclear Reactions

Photon '95

Photon-photon Collisions at the Next Linear Collider

Photon Collider Physics with Real Photon Beams

The advent of back-scattered laser beams for ee^- colliders will allow detailed studies of a large array of high energy $[\gamma][\gamma]$ and $[\gamma]e$ collision processes with polarized beams. These include tests of electroweak theory in photon-photon annihilation such as $[\gamma][\gamma] \rightarrow WW^-$, $[\gamma][\gamma] \rightarrow Higgs$ bosons, and higher-order loop processes, such as $[\gamma][\gamma] \rightarrow [\gamma][\gamma]$, H^0Z^0 and ZZ : Methods for measuring the anomalous magnetic and quadrupole moments of the W and Z gauge bosons to high precision in polarized electron-photon and photon-photon collisions are discussed. Since each photon can be resolved into a $W+W^-$ pair, high energy photon-photon collisions can also provide a remarkably background-free laboratory for studying WW collisions and annihilation. I also review high energy $[\gamma][\gamma]$ and $e[\gamma]$ tests of quantum chromodynamics, including the production of two gluon jets in photon-photon collisions, deeply virtual Compton scattering on a photon target, and leading-twist single-spin asymmetries for a photon polarized normal to a production plane. Exclusive hadron production processes in photon-photon collisions provide important tests of QCD at the amplitude level, particularly as measures of hadron distribution amplitudes which are also important for the analysis of exclusive semi-leptonic and two-body hadronic B-decays.

The proceedings report results on all aspects of high energy photon interactions on photon, proton and Pomeron targets. There are significant contributions from the LEP experiments, from ZEUS and H1, from CLEO II and from the TRISTAN experiments in Japan, accompanied by extensive theoretical discussion and predictions for future gamma-gamma colliders. Contents: Photon and Proton Structure Inclusive Processes: Charm Production Inclusive Processes: General Exclusive Processes in $\gamma\gamma$ Diffractive and Elastic Scattering Future Directions Related Fields Summary Talks Readership: Researchers and scientists in high energy physics. keywords:

The collisions of high energy photons produced at a electron-positron collider provide a comprehensive laboratory for testing QCD, electroweak interactions and extensions of the standard model. The luminosity and energy of the colliding photons produced by back-scattering laser beams is expected to be comparable to that of the primary ee^- collisions. In this overview, we shall focus on tests of electroweak theory in photon-photon annihilation, particularly $[\gamma][\gamma] \rightarrow W+W^-$, $[\gamma][\gamma] \rightarrow Higgs$ bosons, and higher-order loop processes, such as $[\gamma][\gamma] \rightarrow [\gamma][\gamma]$, $Z[\gamma]$ and ZZ . Since each photon can be resolved into a $W+W^-$ pair, high energy photon-photon collisions can also provide a remarkably background-free laboratory for studying WW collisions and annihilation. We also review high energy $[\gamma][\gamma]$ tests of quantum chromodynamics, such as the scaling of the photon structure function, $t\{\bar{t}\}$ production, mini-jet processes, and diffractive reactions.

Absorption of High Energy Gamma Rays Through Single Pair Production in Photon-photon Collisions with the Blackbody Cosmic Radiation

Physics in Collision 13

Jets in Photon-photon Collisions

Lepton-photon 01 : Rome, Italy, 23-28 July 2001

High Energy Photon-photon Collisions

This important book covers topics that are of major interest to the high energy physics community, including the most recent results from flavour factories, dark matter and neutrino physics. In addition, it considers future high energy machines.

"The production of photons in the energy range of 0 to 3 GeV is discussed as a signature of the creation of a quark-gluon plasma in ultrarelativistic nuclear collisions. However, they are also created in the hadronic phase. Therefore I investigate the role of the $\rho \rightarrow \pi\gamma$ and $\pi^0 \rightarrow \pi\gamma$ reactions in the photon emission from hot hadronic matter, and I compare their respective importance. These reactions are known to be the leading contributions. For this purpose I use diverse effective chiral Lagrangians that are in accord with known empirical properties of strong interaction. Then I discuss the relevance of my work to heavy ion collisions." --

High energy photon - photon collisions can be achieved by adding high average power short-pulse lasers to the Linear Collider, enabling an expanded physics program for the facility. The technology required to realize a photon linear collider continues to mature. Compton back-scattering technology is being developed around the world for low energy light source applications and high average power lasers are being developed for Inertial Confinement Fusion.

Proceedings of the XXI International Symposium : Fermi National Accelerator Laboratory, USA, 11-16 August 2003

ICHEP 2004(In 2 Volumes)

Lepton And Photon Interactions At High Energies - Proceedings Of The Xxii International Symposium

Photon 2007: Proceedings of the International Conference on the Structure and Interactions of the Photon, Including the 17th International Workshop on Photon-Photon Collisions And the International Workshop on High Energy Photon Linear Colliders, Paris, France 9-13 July 2007

Photon 2001

This volume contains contributions to the XXI International Symposium on Lepton and Photon Interactions at High Energies, held at the Fermi National Accelerator Laboratory. It gives up-to-date reviews of all aspects of particle physics, written by leading practitioners in the field. The review nature of all the articles makes this volume more accessible to students and researchers in other fields of physics. In addition to new experimental data and advances in theory, the future directions and prospects for the field are covered.

The Next Linear Collider (NLC) offers an opportunity to use high energy photon collisions to probe basic particle structures. The production of high energy gammas from collisions between the NLC high energy electrons and low energy photons places difficult requirements on the laser low energy photon source [1]. The photon wavelength must be approximately one micron since longer wavelengths will decrease the electron utilization efficiency, and shorter wavelengths will open a loss channel for gammas through electron pair creation. The laser pulse format must match the electron generation format of the NLC. The electrons are produced in macropulses at 120 Hz. Each macro-pulse consists of around 100 subpulses separated by 2.8 nanoseconds. To interact efficiently with the electrons the laser subpulses must have approximately a 2 picosecond pulse duration. Analysis of the photon densities required for efficient utilization of the electrons and the focusing capabilities of the final photon injection optics leads to a required photon sub-pulse energy of approximately one joule. Thus the laser macro-pulse energy must be 100 joules at 120 Hz. The laser average power will be 12 kW.

The Lepton-Photon symposiums — as represented by the contributions in this volume — are among the most popular conferences in high energy physics since they give an in-depth snapshots of the status of the field as provided by leading experts. The volume covers the latest results on flavor factories, quantum chromodynamics (QCD), electroweak physics, dark matter searches, neutrino physics and cosmology, from a phenomenological point of view. It also offers a glimpse of the immediate future of the field through summaries on the status of the next generation of high energy accelerators and planned facilities for astroparticle physics. The review nature of the articles makes the volume particularly useful to students, as well as being of interest to established researches in high-energy physics and related fields.

Proceedings of the International Workshop on High-Energy Photon Collisions at the LHC, CERN, Geneva, Switzerland, 22-28 April 2008

Lepton and Photon Interactions at High Energies

Scientific and Technical Aerospace Reports

From TRISTAN to J/N-LC

Laser Source for the γ - γ Collider

The advent of a next linear e^+e^- collider and back-scattered laser beams will allow the study of a vast array of high energy processes of the Standard Model through the fusion of real and virtual photons and other gauge bosons. As examples, The author discusses virtual photon scattering $\gamma^* \gamma^* \rightarrow X$ in the region dominated by BFKL hard Pomeron exchange and report the predicted cross sections at present and future e^+e^- colliders. The authors also discusses exclusive $\gamma\gamma$ reactions in QCD as a measure of hadron distribution amplitudes and a new method for measuring the anomalous magnetic and quadrupole moments of the W and Z gauge bosons to high precision in polarized electron-photon collisions.

The 32nd International Conference on High Energy Physics belongs to the Rochester Conference Series, and is the most important international conference in 2004 on high energy physics. The proceedings provide a comprehensive review on the recent developments in experimental and theoretical particle physics. The latest results on Top, Higgs search, CP violation, neutrino mixing, pentaquarks, heavy quark mesons and baryons, search for new particles and new phenomena, String theory, Extra dimension, Black hole and Lattice calculation are discussed extensively. The topics covered include not only those of main interest to the high energy physics community, but also recent research and future plans. Contents:

Neutrino Masses and Mixings Quark Matter and Heavy Ion Collisions Particle Astrophysics and Cosmology Electroweak Physics QCD Hard Interactions QCD Soft Interactions Computational Quantum Field Theory CP Violation, Rare Kaon Decay and CKMR&D for Future Accelerator and Detector Hadron Spectroscopy and Exotics Heavy Quark Mesons and Baryons Beyond the Standard Model String Theory Readership: Experimental and theoretical physicists and graduate students in the fields of particle physics, nuclear physics, astrophysics and cosmology. **Keywords:** High Energy Physics; Particle Physics; Electroweak; QCD; Heavy Quark; Neutrino; Particle Astrophysics; Hadron Spectroscopy; CP Violation; Quark Matter; Future Accelerator

Photon-photon interactions have been an important probe into fundamental particle physics. Until recently, the only way to produce photon-photon collisions was parasitically in the collision of charged particles. Recent advances in short-pulse laser technology have made it possible to consider producing high intensity, tightly focused beams of real photons through Compton scattering. A linear e^+e^- collider could thus be transformed into a photon-photon collider with the addition of high power lasers. In this paper they show that it is possible to make a competitive photon-photon collider experiment using the currently mothballed Stanford Linear Collider. This would produce photon-photon collisions in the GeV energy range which would allow the discovery and study of exotic heavy mesons with spin states of zero and two.

Absorbed Dose and Collision Kerma Relationship for High-energy Photons

High Energy Photon-photon and Electron-photon Collisions

Photon-LHC-2008

Joint International Lepton-photon Symposium And Europhysics Conference On High Energy Physics - Lp-hep '91 (In 2 Volumes)

This volume contains contributions to the XXI International Symposium on Lepton and Photon Interactions at High Energies, held at the Fermi National Accelerator Laboratory. It gives up-to-date reviews of all aspects of particle physics, written by leading practitioners in the field. The review nature of all the articles makes this volume more accessible to students and researchers in other fields of physics. In addition to new experimental data and advances in theory, the future directions and prospects for the field are covered. The proceedings have been selected for coverage in: • Index to Scientific & Technical Proceedings® (ISTP® / ISI Proceedings) • Index to Scientific & Technical Proceedings (ISTP CDROM version / ISI Proceedings) • CC Proceedings — Engineering & Physical Sciences

The collisions of photons at a high energy electron-positron collider provide a comprehensive laboratory for testing QCD, electroweak interactions, and extensions of the standard model. It is expected that by using back-scattered laser beams that the effective luminosity and energy of photon-photon collisions will be comparable to that of the primary ee^- collisions. In this talk, I will focus on tests of electroweak theory in photon-photon annihilation such as $[\gamma][\gamma] \rightarrow W+W-$, $[\gamma][\gamma] \rightarrow$ Higgs boson, and higher-order loop processes, such as $[\gamma][\gamma] \rightarrow [\gamma][\gamma]$, $Z[\gamma]$ and ZZ . Since each photon can be resolved into a $W+W-$ pair, high energy photon-photon collisions can also provide a remarkable background-free laboratory for studying WW collisions and annihilation. I also review high energy $[\gamma][\gamma]$ tests of quantum chromodynamics, such as the scaling of the photon structure function, $t\bar{t}$ production, mini-jet processes, and diffractive reactions.

Two-photon physics, i.e. photon-photon collisions in electron-positron colliders, a relatively new field in elementary particle physics, has become very popular in the last 20 years. Many experiments have been performed in this field, and the theoretical implications (in particular in quantum chromodynamics) have been studied in much detail. Nine international workshops devoted to two-photon physics have taken place between 1973 and 1992. This meeting was particularly timely, since a new generation of electron-positron colliders is presently being built or planned. These colliders will involve a large spectrum of beam energies, but their common characteristics should be a high particle flux (luminosity). This should allow for measuring many new phenomena as well as for studying known processes with much higher precision than before. Particularly promising is the prospect of building a dedicated high-energy photon collider; this should become possible using a laser technique allowing for the "conversion" of a linear electron beam into a photon beam. Over 60 physicists (both experimentalists and theorists), mainly from European countries (France, Britain, Italy, Germany, Russia, as well as Sweden and Switzerland), discussed these new possibilities at the above meeting. Over 30 talks were presented and many extended debates took place.

Including the 18th International Workshop on Photon Photon Collisions and the International Workshop on High Energy Photon Linear Colliders ; Photon09, May 11 - 15, 2009, Hamburg, Germany. Ed.: Olaf Behnke Deutsches Elektronen-Synchrotron

Theory

PHOTON 2007 : proceedings of the International Conference on the Structure and Interactions of the Photon, including the 17th International Workshop on Photon-Photon Collisions and the International Workshop on High Energy Photon Linear Colliders ; Paris, France ; 9 - 13 July 2007

Lepton And Photon Interactions At High Energies: Lepton-photon 2003 - Proceedings Of The Xxi International Symposium

Photon Production in High Energy Heavy Ion Collisions

This volume reports on all aspects of high energy photon interactions using both photon and proton targets. Significant new results from the LEP and HERA experiments as well as from CLEO II and BELLE are presented. These data are confronted with diverse theoretical models. In particular, predictions of QCD in both the perturbative and the non-perturbative sector are extensively discussed. The prospects for gamma-gamma physics at future high energy colliders are also reviewed. In total 72 papers are

collected. The proceedings have been selected for coverage in: ? Index to Scientific & Technical Proceedings (ISTP CDROM version / ISI Proceedings)

The proceedings blend current and future two-photon physics. Developments since the last Photon-Photon Workshop four years ago are summarized, and the future of the field is projected, not only at existing accelerators, but also at heavy-ion colliders B-factories, and especially linear colliders with back-scattered laser beams.

This volume reports on all aspects of high energy photon interactions using both photon and proton targets. Significant new results from the LEP and HERA experiments as well as from CLEO II and BELLE are presented. These data are confronted with diverse theoretical models. In particular, predictions of QCD in both the perturbative and the non-perturbative sector are extensively discussed. The prospects for gamma-gamma physics at future high energy colliders are also reviewed. In total 72 papers are collected. The proceedings have been selected for coverage in: • Index to Scientific & Technical Proceedings (ISTP CDROM version / ISI Proceedings) Contents: Photon Structure: The Structure of Real Photons at HERA (A Valkárová) Summary of the Session (R Nisius) Jets and Inclusive Hadron Production: Di-jet Production in Photon-Photon Collisions (T Wengler) QCD Tests with Jets at HERA (T Schörner) Charm and Beauty Production: Bottom Production at HERA (M Turcato) Heavy Flavour Production in Two-Photon Interactions (V P Andreev) Total Cross-sections and Diffraction: Impact Factors of Virtual Photons at NLO (V S Fadin) Double-Tag Events in Two-Photon Collisions (C H Lin) Resonances and Exclusive Channels: Meson Resonances in Proton-Antiproton Annihilation (C Amsler) Resonances and Exclusive Channels: An Experimenter's Summary (S Braccini) Future Projects and Related Topics: Photon Collider at TESLA (V I Telnov) Photons and QCD at LHC with ATLAS (S Tapprogge) Summary: Summary of Photon 2001 (A Böhrer & M Krawczyk) and other papers Readership: Graduate students and researchers in high energy and particle physics. Keywords:

High-energy QCD Asymptotics of Photon-photon Collisions

Proceedings of the International Conference on the Structure and the Interactions of the Photon

TAUP 91

XX International Symposium on Lepton and Photon Interactions at High Energies

Evidence for Hard Scattering of Hadronic Constituents of Photons in Photon-photon Collisions at TRISTAN

Proceedings of the NATO Advanced Study Institute and Ninth Course of the International School of Cosmic Ray Astrophysics, Ettore Majorana Centre, Erice, Sicily, Italy, 7--18 May 1994

High Energy Photons from Proton-nucleon Collisions

Physics Opportunities at a Photon--Photon Collider

International Conference on the Structure and Interactions of the Photon : Including the 14th International Workshop on Photon-Photon Collisions, Ascona, Switzerland, 2-7 September 2001

Gamma-Gamma Collisions and Related Processes

High Energy Physics