Past Physics Seminar Calendar: 2004-2005

Advanced Clinical Dosimetry Techniques in Radiation Therapy

Jan Seuntjens (Medical Physicist, McGill University)

Date: 2004-09-27
Time: 15:30-16:30
Abstract:

In radiation therapy, accurate dose determination and treatment delivery are directly associated with better outcome in terms of higher tumor control and lower complication rate. It is traditionally considered a goal in dose delivery to achieve an accuracy of +/-5%(1 sigma). The absorbed-dose delivered to the target and critical structures is the result of a number of steps involving the calibration of the treatment machine, the localization of the target volume and critical structures, the treatment planning dose calculation and the delivery. Each of these steps has distinct contributions to the uncertainty in the dose delivered to the various structures. Accurate dosimetry procedures that deal with the calibration of the therapy unit in absolute terms (i.e., clinical reference dosimetry) as well as treatment planning procedures associated with estimating dose distributions delivered to the patient (``patient-specific dosimetry'') are both contributors to the overall uncertainty in the delivered dose. Our research program at McGill revolves around accurate dosimetry techniques at both the level of clinical reference dosimetry as well as patient-specific dosimetry. In the presentation ongoing projects dealing with clinical reference dosimetry as well as research strategies and results aiming to improve patient-specific dosimetry will be discussed.

Status: CONFIRMED

The Science and Technology of the Bush National Missile Defense

Theodore Postol (Physicist, defense technology and strategy expert, MIT)

Date: 2004-09-30
Time: 14:30-15:30
Abstract:

OCIP Seminar MCD 121, Thursday, September 30, 2:30 pm *** NOTE UNUSUAL LOCATION ***

Status: CONFIRMED

Thanksgiving

Date: 2004-10-11
Time: 15:30-16:30
Abstract:

Thanksgiving. No seminar today.

Status: CONFIRMED

Final result of the Mainz Neutrino Mass Experiment

Christine Kraus

Date: 2004-10-18
Time: 15:30-16:30
Abstract:

The Mainz Neutrino Mass Experiment is based on the MAC-E-Filter (Magnetic Adiabatic Collimation, followed by an Electrostatic Filter) principle, and measures precisly the spectral shape of beta-decay electrons close to the endpoint at 18.6 keV. The spectrometer combines high luminosity and high energy resolution at low background. These features are of decisive importance for the experimental sensitivity to m^2_{ u_e} in the endpoint region of the tritium-beta-spectrum. The results of the final analysis of the data from 1997 to 2001 will be presented, including a more sophisticated approach to the systematic uncertainties. However, the Mainz experiment has reached it's sensitivity limit. Therefore the last part of the talk will introduce the next generation Tritium-beta-experiment KATRIN.

Status: CONFIRMED

Lessons learned from HERA-B

Carsten Krauss, Queen's University

Date: 2004-10-25
Time: 15:30-16:30
Abstract:

Between 1994 and 2001 the HERA experiment HERA-B was built and commissioned with the aim to measure CP violation in the B0-B0-bar sector. In many ways this experiment pioneered high-rate experimental techniques in high energy physics. The experiment itself however was a failure in its goal. This talk will take a look back to the extraordinary achievements in detector building and try to point out the decisions that led to the failure.

Status: CONFIRMED

Seminar on Wed instead

Date: 2004-11-01
Time: 15:30-16:30
Abstract:

See seminar on Wed

Status: CONFIRMED

Determination of |Vub| using semileptonic B decays

D. Fortin (University of Victoria)

Date: 2004-11-03
Time: 16:30-17:30

Abstract:

The BABAR detector is located at the Stanford Linear Accelerator Center and studies the millions of BBbar meson pairs produced by the PEP-II electron-positron collider. The main goal of the experiment is to study CP violation in the B meson system and test with precision the SM mechanism for CP violation through the Cabbibo-Kobayashi-Maskawa (CKM) matrix. If the SM description is correct, the CKM matrix is unitary and can be parameterized with 3 real angles and one imaginary phase. The CP asymmetries measured at BABAR yield information on the angles of this unitarity triangle. Thus, precise information is needed on the sides in order to test the SM description of CP violation. This may be obtained by measuring the magnitude of the weak couplings between quark species. One of the least well measured couplings is that of the b-quark to the u-quark, embodied in the element |Vub| of the matrix; it has uncertainties of approximately 20% at present. Using the 2000-2002 dataset of 88 million BBbar meson pairs, BABAR has the opportunity to make a much improved measurement of |Vub|. In this presentation, I summarize results from semileptonic studies at BABAR, with an emphasis on the inclusive q^2-E_l method. In this particular analysis, decays are primarily identified by the presence of a high momentum electron and a neutrino inferred from the missing momentum. Further selection requirements are made on the electron energy and the invariant mass squared of the neutrino-electron pair to suppress the dominant background from semileptonic B decays to charm. Signal efficiency and background estimates derived from Monte Carlo simulations are adjusted using a control sample and then used to measure the inclusive branching fraction for B--> X_u e nu decays. Combining this measurement with the B lifetime and using theoretical input allows for the determination of the CKM matrix element |Vub|. Preliminary results yield a measurement of B(B --> X_u e nu) = (2.37 +/- 0.77) x 10^-3, and |Vub| = (4.57 +/- 0.77) x 10^-3. ****Note unusal date and time!*****

Status: CONFIRMED

New models of EWSB

David Rainwater (University of Rochester)

Date: 2004-11-08
Time: 15:30-16:30
Abstract:

I discuss new models proposed to solve the immediate problem of what causes electroweak symmetry breaking in nature. Most, but not all, of the new approaches involve elements of old methods, such as supersymmetry or strong dynamics, but in novel new ways. Other methods involving additional spacetime dimensions are completely new. The motivation of some of these models is simply to try new ideas, but often to solve other physics problems simultaneously. A broad conclusion is that distinguishing what sort of physics is responsible for EWSB will almost certainly involve looking outside the scalar ("Higgs") sector.

Status: CONFIRMED

The T2K Project and the Near Detector Tracker

Dean Karlen (University of Victoria)

Location: HP4351

Date: 2004-11-11
Time: 16:30-17:30
Abstract:

The T2K experiment will use an off-axis neutrino beam, produced at the future Japanese Proton Accelerator Research

Center, directed towards the Super Kamiokande detector, some 300 km away, in order to measure neutrino oscillation parameters. To monitor the neutrino beam and measure neutrino interaction cross sections, a "near detector" will be constructed 280 m downstream of the proton target, using the UA1 magnet, fine grained scintillator targets, an electromagnetic calorimeter, and Time Projection Chamber (TPC) modules. The presentation will introduce neutrino oscillation physics and the T2K project, report on its status, and focus on the plans for the near detector, in particular the TPCs. The design of the TPC will take advantage of recent work that has been carried out to develop a TPC for a future Linear Collider.

Contact: M. Vincter

Status: CONFIRMED

Challenges for biologically based treatment planning

Marco Carlone (The Ottawa Hospital Regional Cancer center)

Location: HP4351

Date: 2004-11-15
Time: 15:30-16:30
Abstract:

Since the publication of the influential paper by Brenner and Hall in 1999, there has been considerable interest in determining radiobiological parameters by analyzing clinical outcomes using TCP or NTCP models. The initial suggestion (hypothesis) was that the parameters describing the response to fractionation for prostate cancer could be determined from such an analysis. This method is now being extended by other authors to more general problems in clinical radiobiology. For instance, clinically derived parameters are now being used to estimate TCP, the effect of cold spots, and clonogen density. This initial hypothesis by Brenner and Hall has never been validated in a mathematically rigorous manner. This presentation consists of two parts; the first part of this presentation examines the usefulness of the linear quadratic model in biologically based treatment planning. It is well known that the linear quadratic model looses accuracy at large doses, which brings up the question of whether it can be useful in the general problem of biologically based treatment planning. A mathematical argument is presented to show that the linear quadratic model is insufficient for this general purpose. The second part of this presentation shows that the hypothesis of Brenner and Hall is not valid, and that the process of modeling clinical outcomes is fundamentally limited since it can do no better than estimate the dose of 50% tumour control. The presentation concludes by suggesting that a new formalism of cellular dose response is required for radiobiological models to be credibly used in treatment planning. The qualities of this new formalism and possible methods of determining the necessary parameters are also suggested.

Contact: D. Rogers

Status: CONFIRMED

ILC Large Detector Design Studies

Mike Ronan (Lawrence Berkeley National Laboratory)

Location: HP5115

Date: 2004-11-19
Time: 10:00-11:00

Abstract:

The International Linear Collider (ILC) Physics and Detector Study Group is launching gasous and silicon detector design studies. The large gaseous detector models being considered use a high precision vertex detector and large volume Time Projection Chamber (TPC) for charged particle tracking. New approaches to large volume calorimetry with good particle flow performance are being considered. In this talk, the conceptual designs, expected performance and preparations for detailed simulation and physics bench marking will be outlined. Some new Berkeley-Orsay-Saclay results on Micromegas TPC R&D studies will also be presented.

Contact: M. Dixit

Status: CONFIRMED

Exciting Hybrid Mesons

Jo Dudek (JLAB)

Location: HP4351

Date: 2004-11-22
Time: 15:30-16:30
Abstract:

The structure of QCD, the theory of the strong interactions, leads us to believe there should be meson states which contain an excitation of the gluonic field. We call such states hybrid mesons. Models, along with QCD computed on a space-time lattice lead us to believe that these states should have masses reachable by current and future experiments. I will discuss how hybrids are described in the flux-tube model and how within this framework we have calculated production rates for a number of processes.

Contact: S. Godfrey

Status: CONFIRMED

Image guided intensity modulated Radiotherapy: Painting with Photons

Paul J Reckwerdt
President & COO, TomoTherapy Inc
Madison WI

Location: HP 5115

Date: 2004-12-03
Time: 14:30-15:30
Abstract:

The exciting new developments with image guided intensity modulated radiotherapy for cancer treatment rests on some

very solid physical principles used in image science. The adoption of these principles into radiotherapy have started an explosion of new treatment modalities. A discussion of the underlying science and its application will be presented. Current clinical treatments will also be shown.

Contact: Dave Rogers

TomoTherapy Inc is the manufacturer of the worlds most exciting new technology for cancer radiotherapy.

Status: CONFIRMED

Crisis in Health Care Financing in North America: A Medical Physicist's Perspective

Ervin Podgorsak, Director, McGill Medical Physics Unit, Montreal General Hospital

Location: HP4351

Date: 2004-12-06
Time: 15:30-16:30
Abstract:

Health care financing in Canada and the United States is in crisis; however, the causes of the crisis are different. The two countries have fairly similar economic, political and social systems but are at two extremes as far as health care financing is concerned. Among the developed countries, the American health care system is the most privatized; the Canadian health care system is the most nationalized. The standards of modern medicine are similar in the two countries; however, the U.S. clearly leads Canada in availability of high technology equipment and in timely access to health care services, at least for the 85% of the population that is covered by health insurance. On the other hand, 15% of the U.S. population is not covered by any health insurance and their access to health care is severely restricted. Despite the difficulties that Canada has with financing of health care resulting in poor access to high technology equipment and waiting lists for medical services, the health care indicators, such as life expectancy, infant mortality and maternal mortality, favor Canada in comparison to the U.S. A conclusion can thus be reached that the Canadian model of nationalized health care delivery is less expensive, more efficient and more socially just than the U.S. privatized health care system.

Contact: D. Rogers

Status: CONFIRMED

Fall graduate student talks

Location: University of Ottawa, MCD 146

Date: 2004-12-07
Time: 13:30-17:00
Abstract:

13:30	Tim Gorjanc (U. Ottawa)	Organic Field Effect Transistors

14:00	Lesley Buckley (Carleton U.)	EGSnrc investigation of correction factors for radiation
14:30	Laurette McCormick (U. Ottawa)	The molecular end effect and its critical impact on the behaviour of charged-uncharged polymer conjugates during free solution electrophoresis
15:00		Break with refreshments /Pause avec rafrachissements
15:30	Nishard Abdeen (Carleton. U.)	Demonstration of prolongation of alveolar gas transfer times by Hyperpolarized 129 Xenon spectroscopy in rats with Stachybotrys chartarum spore induced pneumonitis
16:00	Robert Walker (U. Ottawa)	Shaping the radiation field profile of tilted fibre Bragg gratings
16:30	Gordana Tesic (Carleton U)	Solar Neutrino Oscillation Analysis

Contact: G. Oakham

Status: CONFIRMED

The ATLAS Project at the Large Hadron Collider: Exploring the High-Energy Frontier of Particle Physics

Peter Jenni, CERN Laboratory

Location: Steacie 312

Date: 2004-12-08
Time: 15:30-16:30
Abstract:

ATLAS is a particle physics experiment based at the CERN laboratory in Geneva, Switzerland that will explore the fundamental nature of matter and the basic forces that shape our universe via head-on collisions of protons of extraordinarily high energy at the the Large Hadron Collider (LHC). ATLAS is the largest collaborative effort ever attempted in the physical sciences. There are 1800 physicists participating from more than 150 universities and laboratories in 34 countries, including several teams from Canadian universities. ATLAS is scheduled to take first data in 2007. Peter Jenni is the spokesperson of this international collaboration. He will speak to us of the rich prospects for fundamental physics that will be explored at ATLAS as well as the current state of the experiment and of the LHC.

Please join us for refreshments at 15:15

Contact: M. Vincter

Status: CONFIRMED

OCIP Christmas Symposium

Location: 301 Azrieli Theatre at Carleton

Date: 2004-12-15

Time: 09:00-12:30
Abstract:

room 301 Azrieli Theatre at Carleton

9:00	Andre Longtin	Non-linear Dynamics of Electroreception
9:30	Alain Bellerive	What can we learn about neutrinos at SNOLAB?
10:00	Xiaoyi Bao	Distributed strain and temperature sensor development and application in structural health monitoring with centimetre spatial resolution
10:30		Coffee Break
11:00	Ruth Wilkins	Biological Dosimetry for Radiological Emergency Response
11:30	Stephen Mihailov	Ultrafast Laser Fabrication of Bragg Grating Devices
12:00	Bruce Campbell	Superstrings: the dreams that stuff is made of?

Contact: G. Oakham

Status: CONFIRMED

Physics Department Event

Date: 2005-01-20
Time: 15:30-18:00
Abstract:

Contact: R. Hemingway

Status: CONFIRMED

Jun Miyamoto

TBA

Date: 2005-01-31
Time: 15:30-16:30
Abstract:

This seminar is postponed to a later date!!!!!!

Contact: M. Vincter

Status: CANCELLED

Study of the CPC tracking chambers for the ALICE dimuon spectrometer

Khalil Boudjemline (Carleton University)

Location: HP4351

Date: 2005-02-14
Time: 15:30-16:30
Abstract:

ALICE (A Large Ion Collider Experiment) is the only detector dedicated to the study of nucleus-nucleus interactions at the LHC. It will investigate the physics of strongly interacting matter at extreme energy densities, where the formation of a new phase of matter, the quark-gluon plasma (QGP), is expected. ALICE is composed of many sub-detectors. Among of them, the forward muon spectrometer which include absorbers, dipole magnet, ten tracking chambers and four trigger chambers. The main purpose of the forward muon arm is to measure the complete spectrum of heavy quark vector mesons J/psi, psi', Upsilon, Upsilon', Upsilon" via their muonic decay (u+u-) in heavy-ion collisions. The melting of these resonances is one of the most promising signatures of QGP formation. Related to the design of this detector at SUBATECH, the developpement of the tracking chamber (CPC) has been carried out. In-beam tests were led at CERN. The goal of these tests was to validate the operation of Cathode Pad Chamber in term of spatial resolution and reconstruction efficiency. A full simulation of chamber response using Monte-Carlo method was done. The goal was both, to reproduce experimental data, and to introduce the track angle effect into the simulation code of ALICE experiment (AliRoot). As expected, inclined tracks deteriorate the momentum estimation, and consequently, deteriorate the invariant mass resolution of resonances.

Contact: M. Vincter

Status: CONFIRMED

Very High Energy Gamma-ray Astronomy with VERITAS

David Hanna (McGill University)

Location: HP4351

Date: 2005-02-28
Time: 15:30-16:30
Abstract:

Gamma-ray astronomy is normally carried out using space-borne instruments since gamma-rays cannot penetrate the Earth's atmosphere. At energies greater than a few tens of GeV, however, one can detect astrophysical gamma-rays using ground-based instruments which exploit the fact that the incident photons give rise to showers of relativistic electrons. The Cherenkov light emitted by these electrons can be collected and imaged by detectors comprising large mirrors and photomultipliers. This 'atmospheric Cherenkov technique' has been used successfully since 1989 and has created a new branch of astronomy with strong links to high energy astrophysics and particle astrophysics. The VERITAS detector is an array of four large gamma-ray telescopes currently being constructed on Kitt Peak in Arizona and is one of a quartet of second-generation devices worldwide. Beginning in 2006, this detector will explore the northern sky with unprecedented precision and sensitivity. This talk will describe the scientific motivation for VERITAS and explain the instrumentation and techniques involved. It will include a status report on construction progress and include results from the first telescope of the array.

Contact: M. Vincter

Status: CONFIRMED

Searching for Truth using the DZero experiment

Brigitte Vachon (McGill University)

Location: HP4351

Date: 2005-03-07
Time: 15:30-16:30
Abstract:

The Fermilab Tevatron is the highest energy collider in the world. Protons and antiprotons are brought into collisions at the unprecedented centre-of-mass energy of 2 TeV. The DZero experiment, one of two multi-purpose detectors designed to study these high energy collisions, will be briefly described. The Tevatron collider is the only facility in the world where the heaviest fundamental particle, the Top (or Truth) quark, can be directly studied. In proton-antiproton collisions, Top quarks are predominantly produced in pairs via the strong interaction. In addition, the Standard Model of particle physics also predicts the electroweak production of events containing a single Top quark. Due to its small expected production cross-section and large background contamination, the single production of Top quarks has never been observed. Given the current collision centre-of-mass energy and the foreseen amount of data to be recorded, this unique production mechanism is expected to be observed for the first time at Fermilab in the near future. Preliminary results for the search for single Top quarks production will be presented.

Contact: M. Vincter

Status: CONFIRMED

Measuring the W Mass at D0

Marco Verzocchi (University of Maryland, D0 experiment)

Location: HP4351

Date: 2005-03-09
Time: 09:00-10:00
Abstract:

Experiments performed in the last 30 years have lead to a revolution in the understanding of the weak force and to the successfull unified description of electromagnetism and of the weak force in the Glashow-Salam-Weinberg theory. This has changed our perspective on the origin of the masses of the elementary constituents of matter. The masses of the charged fermions and of the weak bosons are generated from their interactions with a yet unobserved Higgs boson field. The precision measurements of the mass of the W boson and of the top quark allow a restriction of the allowed range of the mass of the Higgs boson. In this talk the current status of the W mass mesurement using the data collected with the D0 detector at the Tevatron collider will be reviewed.

Contact: P. Kalyniak

Status: CONFIRMED

String Theory: Quantum Mechanics and Gravity: the Start of a Beautiful Relationship?

C. Burgess (McGill/McMaster/Perimeter)

Date: 2005-03-10
Time: 15:30-16:30
Abstract:

Location: 240TB.

Note that this is the CAP lecture.

String theory is our best candidate for a theory of the physics at very short distances, and is the only known candidate theory which handles quantum corrections to gravity in a reasonable way at the shortest distances. In this talk I summarize the advances which have been made in understanding string theory, and the problems which remain to be solved.

Contact: M. Vincter

Status: CONFIRMED

Fermion Masses, Neutrino Oscillations and SUSY Grand Unification

Mu-Chun Chen (Brookhaven National Laboratory)

Location: HP4351

Date: 2005-03-14
Time: 16:15-17:15
Abstract:

The origin of fermion masses and mixing remains a puzzle in particle physics. In this talk, I will describe how the number of parameters in the Yukawa sector that parameterize all fermion masses and mixing angles can be reduced by imposing symmetries, and argue why small neutrino masses and their large mixing are closely connected to the unification of the strong, weak and electromagnetic forces. This is demonstrated in a specific model based on SUSY SO(10) combined with an SU(2) family symmetry in which a set of symmetric matrices with five texture-zeros (having eleven parameters) can lead to values of twenty-two measurable masses and mixing angles of quarks and leptons; the available experimental data is in agreement in atmospheric and solar neutrino cases, leaving the predicted masses of neutrinos and some lepton mixing angles to be verified by future experiments. The predictions for the branching ratios of the lepton flavor violating charged lepton decays in this model are accessible to the next generation of experiments. Current status of the theoretical predictions for proton decay will also be reviewed. Finally, I will delineate a possible connection between neutrino oscillations and the baryon asymmetry of the Universe.

Status: CONFIRMED

The Mystery of Matter

Manuella Vincter (Carleton)

Location: 4499ME

Date: 2005-03-18
Time: 14:30-15:30
Abstract:

One of the primary goals of particle physics is to explain the structure of matter at the smallest distance scales. The attempt to understand the material world around us in the simplest possible terms has involved ingenious feats of scientific sleuthing. Such investigative work has lead us to realize that protons and neutrons, the building blocks of all matter around us, themselves are complex objects with a rich substructure. High energy collisions provide the means to convert energy into new forms of matter not existing on this earth! During this lecture, the evidence leading to our current picture of elementary particles is reviewed, right up to present-day experimental investigations.

This lecture is part of the International Year of Physics undergrad lecture series.

Status: CONFIRMED

Higgs Physics at Hadron Colliders

Heather Logan (University of Wisconsin at Madison)

Location: HP4351

Date: 2005-03-24
Time: 09:00-10:00
Abstract:

The Higgs mechanism is the most attractive explanation for the origin of the masses of subatomic particles. In order to test this explanation, we need to discover the Higgs boson and measure its couplings to Standard Model particles. After a pedagogical introduction, I will describe the prospects for measuring Higgs couplings at the upcoming Large Hadron Collider experiments, both within and beyond the simplest Standard Model scenario.

Contact: P. Kalyniak

Status: CONFIRMED

Testing Einstein's Universe

Norbert Bartel (York U)

Location: University of Ottawa MCD 121

Date: 2005-03-24
Time: 14:30-15:30
Abstract:

Note that this event is at the University of Ottawa MCD 121

Black holes as massive as billions of suns combined, spacetime with curves and warps and galaxies moving at nearly the speed of light -- this is Einstein's universe. For ninety years, Einsteins general theory of relativity has held its place. Now, the Gravity Probe B mission led by NASA and Stanford University and supported by the Harvard-Smithsonian Center for

Astrophysics and York University, puts Einstein to the test as never before. General relativity and quantum theory are the two pillars of modern physics. However, they are completely incompatible. Quantum theory has given us our modern world from the atom bomb to TV and is therefore verified almost every day. General relativity, in contrast, remains verified only at a moderate level of precision. Could it be that Einstein's theory breaks down at some level? I will talk about these issues, explain the working of Gravity Probe B, and show our film "Testing Einstein's Universe."

Status: CONFIRMED

Opportunities and challenges at the Large Hadron Collider

Frank Petriello (Johns Hopkins)

Location: HP4351

Date: 2005-03-29
Time: 16:00-17:00
Abstract:

We begin with a brief review of the Standard Model of particle physics. This framework has several puzzling aspects, and raises many questions: Why are some forces of nature so much stronger than others? Where is the Higgs boson which gives mass to fundamental particles? Where is the dark matter that composes such a large amount of the universe's mass? We discuss various theoretical ideas which answer these questions, such as supersymmetry, extra dimensions, and strong dynamics. The most exciting feature of these ideas is that they are all testable at the LHC. However, it will be difficult to disentangle their signatures from the background of QCD, the strong force. We review theoretical calculations in perturbative QCD which attempt to bring this background under control. Issues which require further study before the turn-on of the LHC are identified and discussed. We present new ideas for calculating at the frontier of perturbation theory, through next-to-next-to-leading order (NNLO) in the QCD coupling constant. Until recently, our inability to perform such computations prevented high-precision phenomenological results from being obtained. We present NNLO results for Drell-Yan and Higgs production at the LHC, which account for all experimental constraints.

Contact: P. Kalyniak

Status: CONFIRMED

Mass, Mixing, and the Neutrino Renaissance

Kevin Graham (Queen's University)

Location: HP4351

Date: 2005-03-31
Time: 16:00-17:00
Abstract:

The Sudbury Neutrino Observatory (SNO) experiment has produced some of the most important results in physics of the last ten years. SNO data have been used to solve the solar neutrino problem and to conclusively prove that neutrinos undergo flavour change thus demonstrating that neutrinos have mass. These measurements require a fundamental change to the standard model of particle physics and have been at the forefront of the current surge of activity in neutrino physics. A brief introduction to the standard model of particle physics will be given with emphasis placed on the role of the neutrino and its properties. An historical description outlining the development of our knowledge of neutrino properties

will be provided. The SNO detector and calibration procedures will be described in detail along with presentation of the latest physics results from the complete salt-phase data set. The impact of these results will be discussed in the context of the solar neutrino problem, in terms of currently favoured neutrino models, and in conjunction with results from other neutrino experiments. The final portion of the talk will explore the future of neutrino physics with focus centred on experiments that can significantly improve our understanding of neutrinos and their properties.

Contact: P. Kalyniak

Status: CONFIRMED

Introductory Medical Physics: What's a Nice Physicist Like You Doing in a Hospital ?

Jerry J. Battista,
Director, Physics Research and Education, London Regional Cancer Centre,
and
Chair, Dept of Medical Biophysics, University of Western Ontario, London, Ontario

Location: 4499ME

Date: 2005-04-01
Time: 13:30-14:30
Abstract:

Medical physics is the application of physical principles, methods, and instrumentation to biomedical systems. Leonardo Da Vinci was one of the first medical physicists, having documented the biomechanics of the human skeleton. Roentgen, Curie, and Becquerel introduced experimental radiation physics, leading to major discoveries in biology (e.g. DNA helix), diagnostic imaging (e.g. radiography), and therapeutics (e.g. cancer). Today there are 15,000 biomedical physicists in the world (about 300 in Canada), working in research labs, radiation protection, biomedical and nuclear industries, universities, cancer treatment centres, and hospitals. The purpose of this presentation is to introduce the vastness of possibilities for contributions of physicists to innovation in biology and medicine. The baby-boomer wave will have an effect by causing a growth in health care service needs (e.g. 4 % per year in cancer cases). The retirement of baby-boomers is also expected to create a deepening staffing void in clinical and academic medical physics. This speciality needs talented young scientists who can first become aware and excited about this field in their early University years.

Contact: Dave Rogers

This lecture is part of the International Year of Physics undergrad lecture series.

Status: CONFIRMED

The Road to Bs Mixing

Steve Nahn (Yale University)

Location: HP4351

Date: 2005-04-05
Time: 16:00-17:00
Abstract:

One of the flagship analyses of the CDF experiment in Run 2 at the Tevatron is the pursuit of mixing of Bs mesons. Using the context of this analysis as an example I will trace the threads of several of the important design decisions and operational issues of the detector and how they impact the final result. As it turns out, getting there is at least half the fun.

Contact: P. Kalyniak

Status: CONFIRMED

Selected Charm Readings From CLEO

David Asner (University of Pittsburgh)

Location: HP4351

Date: 2005-04-06
Time: 13:15-14:15
Abstract:

For 25 years the CLEO experiment at the Cornell Electron Storage Ring (CESR) was at the forefront of B-physics. During this time cutting edge results in charm physics were also produced - including the discovery of the Ds+, searches for charm mixing, and the study of charm meson dynamics. Recently, CLEO and CESR have been modified to run at charm production threshold. The CLEO-c research program will include studies of leptonic, semileptonic and hadronic charm decays, searches for exotic and gluonic matter, and test for physics beyond the Standard Model. Results from CLEO-c will improve our knowledge of the CKM matrix and extend the physics reach of the B-factories and the Tevatron.

Contact: M. Vincter

Status: CONFIRMED

Challenges of the ATLAS Experiment at the LHC

Richard Teuscher (University of Chicago)

Location: HP4351

Date: 2005-04-07
Time: 11:30-12:30
Abstract:

Several hints suggest that we are on the right track towards unification of the fundamental forces: the strong and electroweak coupling constants converge at energy scales of 10**16 GeV, if corrections due to Supersymmetry are

included. "Dark matter", material completely unlike ourselves, yet making up 25% of the universe, may well be explained by a stable neutralino. At the Large Hadron Collider (LHC) at CERN, starting in 2007, we will probe new physics such as SUSY in proton-proton collisions at 14 TeV, extending our reach by an order-of-magnitude over previous colliders. This talk will describe the wealth of physics to be discovered at the LHC, the challenges in building and commissioning the ATLAS detector, and the outlook for the future.

Contact: M. Vincter

Status: CONFIRMED

Split Supersymmetry at Colliders

Wolfgang Kilian(DESY)

Location: HP5115

Date: 2005-05-02
Time: 09:00-10:00
Abstract:

The supersymmetric extension of the elementary particle spectrum is a popular proposal that allows for elegant solutions of many problems in particle physics: it predicts spinless particles that can generate particle masses and the unification of gauge forces, it accomodates dark matter, and it interfaces to models of quantum gravity. Furthermore, to solve the flavor problem of hadronic physics, a split superpartner spectrum is preferred. We investigate the possible signatures of such a setup at the LHC and a future Linear Collider. These involve a long-lived gluino, a Higgs boson, and a spectrum of new neutral and charged fermions. In particular, we present methods and results for the analysis of particle production and decay that can establish the supersymmetric nature of such a model, and predict the dark matter abundance with a precision comparable to the recent measurements.

Contact: P. Kalyniak

Status: TENTATIVE

Introduction to Charm Dalitz Plot Analyses at CLEO

David Asner

University of Pittsburgh
and
Wilson Laboratory

Location: 4351 Herzberg Physics

Date: 2005-05-19
Time: 13:30-14:30
Abstract:

Abstract: Three-body decays of charm mesons are frequently analyzed using the Dalitz plot analysis technique. In this talk I introduce the Dalitz plot analysis techniques and survey the broad range of physics that are probed with these methods which include studies of Standard Model and non-Standard Model CP violation, charm mixing, Cabibbo suppressed processes, properties of light mesons and searches for unestablished low mass pi-pi and K-pi S-wave states.

Contact: P Kalyniak

Status: CONFIRMED

CAP practice talks

Location: HP4351

Date: 2005-05-30
Time: 14:00-16:30
Abstract:

Practice talks for the CAP

Manuella (ATLAS overview)

Claudiu (ATLAS testbeam)

Alain (TPC)

Olivier (SNO optical calibration)

Louise (SNO periodic neutrino rates)

Status: TENTATIVE