

SEMINARS SEMINAIRES

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For information on these seminars, please see
<http://Bulletin.cern.ch/Seminars/>

Tuesday 16 November

CERN HEAVY ION FORUM

at 14.00 hrs – Conference Room, bldg 40/SS-C01

J/psi production from p-p to Pb-Pb collisions

by C. GERSCHEL / IN2P3, Orsay, France &
M. GAZDZICKI / IKF, Frankfurt, Germany

This Heavy Ion Forum will feature two presentations by C. Gerschel and M. Gazdzicki, followed by extensive discussion. Different representations of the J/psi production pattern, at different levels of detail, will be presented and their mutual compatibility and meaning discussed. The question of the existence of discontinuities in the production pattern will be addressed, followed by a critical discussion of a recent suggestion that J/psi production may be statistical.

Organisers: Yiota Foka and Ulrich Heinz
<http://home.cern.ch/a/alicedoc/www/chic/>

Tuesday 16 November

CERN PARTICLE PHYSICS SEMINAR

at 16.30 hrs – Auditorium, bldg 500*

Status of underground dark matter searches

by Nigel J.T. SMITH / Rutherford Appleton
Laboratory, UK

I will review the current status of direct underground searches for the neutralino, the hypothetical WIMP solution to the dark matter problem, focussing mainly on recent results from NaI scintillator detectors. Results of the current UK NaI detector array operated at Boulby mine in North Yorkshire will be discussed, illustrating a population of events of unknown origin. Diagnostic tests performed to investigate the origin of these anomalous events will be described, including alpha, beta and neutron calibrations. Future experiments with improved background discrimination and sensitivity will also be outlined.

Organiser: Jasper Kirkby / EP Division
** Tea & coffee will be served at 16.00 hrs.*

Wednesday 17 November

THEORETICAL SEMINAR

at 14.00 hrs – TH Conference Room, bldg 4

Tachyon-free non-supersymmetric type I string vacua from brane-antibrane systems

by Angel M. URANGA / CERN

Compactifications of Type I string vacua to four dimensions have several phenomenologically interesting features. In particular, they provide an explicit realization of consistent models where gauge theory sectors can be localized on D-branes, while gravity and other fields propagate over all of spacetime. In this talk I will first review the construction of toroidal orbifolds of type I string theory, and discuss their consistency conditions (cancellation of tadpoles). I will show it is possible to construct consistent models which

contain D-branes and anti-D-branes, but are nevertheless stable against decay by brane-antibrane annihilation. These models are non-supersymmetric but free of tachyons. In many examples, supersymmetry is preserved at lowest order in the bulk and in D-brane 'visible' sectors, while supersymmetry is broken at the string scale in 'hidden' anti-D-brane sectors. Models with realistic 'visible' sectors can be easily constructed. Finally, these configurations raise interesting questions concerning the dynamics of the compactification moduli and the dilaton, which have non-trivial potentials due to the lack of supersymmetry.

Thursday 18 November

THURSDAY SEMINAR

at 14.00 hrs – TH Conference Room, bldg 4

A (quantum) group theoretical approach to the genetic code

by Paul SORBA / LAPP, Annecy

The quantum algebra $U_q(\mathfrak{sl}(2)+\mathfrak{sl}(2))$ in the limit $q=0$ is proposed as a symmetry algebra for the genetic code. The triplets of nucleotides (codons) in the DNA chain are classified in crystal bases. This construction might be compared to the baryon classification from quarks in particle physics, one main difference being the natural order in the state constituents provided by the crystal base. An operator ensuring the correspondence codon/amino-acid is built out of the above algebra: two codons relative to the same (resp. different) amino-acid(s) acquire the same (resp. different) eigenvalue(s). The free energy released by base pairing in double stranded RNA is also computed in this model. Finally, it is remarked that the ratio of the codon usage in the quartets and sextets for the vertebrate series exhibit a correlated behaviour which fits naturally in this framework.

Thursday 18 November

JOINT SL/LHC PROJECT SEMINAR

at 16.00 hrs* – SL Auditorium, Prévessin, bldg 864, 1st fl.

Electron Cloud Simulations

by Frank ZIMMERMANN / CERN

In the LHC beam pipe, the emission of photoelectrons and secondary electrons gives rise to a quasistationary electron cloud. The response of this electron cloud to a transversely displaced bunch resembles a short-range wake field and can cause a fast beam instability. More importantly, if no care is taken, the incident electrons induce a significant heat load on the LHC beam screen. They may also cause a pressure rise, as recently observed in the SPS.

This talk describes our computer model of the electron cloud build-up, and presents preliminary simulation results for the LHC and the SPS.

Information:

<http://www.cern.ch/CERN/Divisions/SL/news/news.html>

Organisers: Werner Herr / SL & Ruediger Schmidt / LHC

** Tea and coffee will be served at 15:30 in front of the Auditorium*

Thursday 18 November

SCIENCE AND SOCIETY

at 16.30 hrs* – Auditorium, bldg 500

Digging for the human mind: cognitive archaeology and the origins of science, art and religion

by Steven MITHEN / Reading University

Understanding the nature of the human mind is one of the greatest challenges faced by science, and one which requires the participation of many disciplines. During the last decade there have been strong arguments that an evolutionary perspective on the mind is required — just like any other species humans are the products of biological evolution and this will have moulded the way we think as much as the way we walk and talk. Some evolutionary psychologists go so far as to argue that the way we think remains largely conditioned by the lifestyle of our prehistoric hunter-gatherer ancestors. While there is both logic and substantial evidence for this claim, it fails to account for many of the activities of modern humans which have no evolutionary precedent or even the faintest trace in our closest living relative, the great apes. Notably among these are the pursuit of pure science, art and religion — activities that appear to lack any functional value. In my paper I will suggest how these can indeed be accounted for from an evolutionary perspective by examining the details of the archaeological record and examining the mental architecture of Neanderthals and other human ancestors and relatives.

Organiser : James GILLIES / EP Division

* Tea & coffee will be served at 16.00 hrs.

Friday 19 November

SL CONTROLS SEMINAR

at 11.00 hrs – SL Auditorium, Prévessin, bldg 864, 1st fl.

From SDH* to redundant Optical Networking

by L. DE JONGE

Exploding bandwidth requirements for data, voice and video applications together with new technologies for all optical networks will dramatically change the conventional networks in the near future. Direct connections of IP routers via Wavelength Division Multiplexing (WDM) and Optical Switches are now possible.

We will present the different technologies which have led to Optical Networking and its possible applications at CERN.

*SDH Synchronous Digital Hierarchy

Friday 19 November

MEETING ON PARTICLE PHYSICS PHENOMENOLOGY

at 14.00 hrs – TH Conference Room, bldg 4

Collinear limits of amplitudes in QCD and a new approach to derive the Altarelli-Parisi kernels

by P. UWER / Saclay

We present a recent calculation of the next-to-leading order splitting amplitudes in QCD. Using a new method derived by D. A. Kosower we extend existing results to all orders in the dimensional regularization parameter ϵ . This extension will find applications in NNLO jet physics. In addition to their use in jet physics the higher-order splitting amplitudes can be used to derive the Altarelli-Parisi kernels. We illustrate the new approach by the rederivation of the $g \rightarrow gg$ Altarelli-Parisi kernel at NLO.

Friday* 19 November

CERN COLLOQUIUM

at 16.30 hrs* – Auditorium, bldg 500

Electronic Structure of Matter : Wave Functions and Density Functionals

by Walter KOHN / University of California at Santa Barbara and ETH-Zürich;

Nobel Prize in Chemistry 1998

Since the 1920's Schroedinger wave functions have been the principal theoretical concept for understanding and computing the electronic structure of matter. More recently, Density Functional Theory (DFT), couched in terms of the electronic density distribution, $n(r)$, has provided a new perspective and new computational possibilities, especially for systems consisting of very many (up to ~1000) atoms. In this talk some fundamental limitations of wave function methods for very-many-atom-systems will be discussed. The DFT approach will be explained together with some physical/chemical applications and a discussion of its strengths and weaknesses.

Organiser : Luigi DI LELLA / EP Division

* Please note unusual day.

**Tea & coffee will be served at 16.00 hrs.

Monday 22 November

DETECTOR SEMINAR

at 11.00 hrs – Conference room, bldg 13/2-005

Highlights of the 1999 IEEE Symposium on Nuclear Science

by A. ELLIOTT-PEISERT / CERN-EP

The 1999 IEEE Symposium on Nuclear Science was held in Seattle on 26-30 October. This yearly convention is devoted to instrumentation in high energy and nuclear physics. It covers practically all aspects of particle and radiation detection: gas detectors, photo detection, calorimetry, scintillation detectors, semiconductor detectors and radiation damage, tracking and particle identification, analog and digital circuits. Presentations ranged from descriptions of new radiation detection techniques to first results from working experiments. Selected papers will be presented at the seminar.

Information:

<http://www.cern.ch/CERN/Divisions/EP/Seminars/Welcome.html>

Organiser: Rui RIBEIRO / EP Division

Tuesday 23 November

SCIENCE, TECHNOLOGY & INDUSTRY SEMINAR

at 11.00 hrs – Conference room, bldg 40/S2-A01

ISTC and its practical achievements

by Norihiko YOKOYAMA / International Science and Technology Centre, Moscow, Russia

Since its official start in March 1994, ISTC finances about 830 projects for the total of 230 million dollars. Including completed projects, 30 thousand scientists are/were receiving grants from these projects. To enhance further self-reliance of participants, use of projects results and IPR protection are largely focused upon in the ISTC activity at present. The reporter will present such and other topics of interest.

Tuesday 23 November

CERN PARTICLE PHYSICS SEMINAR

at 16.30 hrs – Auditorium, bldg 500*

The KARMEN time anomaly; status and perspectives

by Guido DREXLIN / FZ Karlsruhe

The KARMEN experiment at the pulsed spallation facility ISIS at RAL makes use of neutrinos from the pion-muon decay chain at rest to search for oscillations of muon- to electron-type antineutrinos, as well as to investigate neutrino interactions with nuclei. Analysis of data taken from 1990-95 (KARMEN1) and 97-99 (KARMEN2) show no evidence for oscillations (constraining the allowed LSND parameter space), and experimental CC and NC cross-sections agree with theory. However, a distinct excess of single isolated neutrino events centered around 3.6 microseconds after beam-on-target has been observed, which is called the KARMEN time anomaly. As the probability for a statistical fluctuation is exceedingly small (4.3 sigma effect) and no systematic explanation for the effect has been found, we propose as a working hypothesis that the origin of the 100 excess events observed so far could come from a rare decay of a pion into a muon together with a massive neutral particle X with 33.9 MeV mass. A detailed likelihood analysis of the entire data set for this hypothesis is presented, and prospects for further experimental tests are outlined.

Organiser : Jasper Kirkby / EP Division

* Tea & coffee will be served at 16.00 hrs.

Thursday 25 & Friday 26 November

TECHNICAL PRESENTATION

09.00-17.00 hrs – Council Chamber, Rooms A & B,
Exhibition Gallery

Workshop on PLCs and Fieldbuses

Programmable Logic Controllers (PLCs) and Fieldbuses are industrial products used for many years in industrial control applications. There are numerous PLC manufacturers; CERN has made a Market Survey and has selected two large manufacturers (Schneider and Siemens) as providers of General Purpose PLCs and supporters of the three CERN recommended Fieldbus Standards (CAN, Profibus and WorldFIP). PLCs and Fieldbuses are basic and complementary elements for control applications. They are already in use in Accelerators and Experiments and current applications will be reported during this Workshop. The CERN management will express their position concerning these recommendations.

Small PLC and Fieldbus-based control systems will be presented by Schneider and Siemens. Demonstrations by the CERN PLC and Fieldbus User's Group (GUAPI) will also be done.

Thursday 25 November

- Recommendations on the use PLC and fieldbuses by the CERN Management
- Technical presentations on PLC by Siemens and Schneider representatives
- Technical presentations on CAN, Profibus and Worldfip by industrial experts
- PLC and fieldbuses support at CERN

Friday 26 November

- Presentation of PLC and Fieldbus Projects at CERN by their authors
- Round Table Discussion and Conclusion

For more details, see

<http://itcowww.cern.ch/PLCWorkshop/plc-fieldbuses.htm>

Languages: English and French

Organisers: G. Baribaud/SL & R. Rausch/SL

Thursday 25 November

CERN HEAVY ION FORUM

at 11.00 hrs – TH Auditorium, bldg 4

1. Quark masses and chiral symmetry at zero and non-zero temperature

by Matthias JAMIN / Inst. fuer Theoretische Physik,
Heidelberg, Germany

The talk is divided in two parts. The first part discusses the phenomenon of chiral symmetry and its breaking at zero temperature.

Different definitions of quark masses will be compared and their extraction from experiment are briefly explained. Also the quark condensate, an order parameter for chiral symmetry breaking, is discussed. Special emphasis will be put on the strange quark mass and condensate. In the second part the temperature dependence of the various quantities introduced in the first part will be described.

We shall briefly comment on modifications at finite density as well.

2. Vector and D-meson production from heavy-ion collisions

by Gennadi LYKASOV / JINR, Dubna, Russia

The possible broadening of omega- and phi-mesons produced by heavy-ion collisions is discussed. The predictions for widths of these mesons as the function of the vector meson momentum at different nuclear densities and initial energies are presented.

Additionally the D-meson production by hadron-hadron and ion-ion interactions is analyzed. The problem related to the possible hidden charm in the hadron and nucleus is discussed. The predictions for the asymmetry of the produced D-mesons as the function of the Feynman variable x and the transverse momentum p_t are presented.

The possible consequences of the obtained results for heavy-ion collisions at high energies are discussed.

Organisers: Yiota Foka and Ulrich Heinz

<http://home.cern.ch/a/alicedoc/www/chic/>

Thursday 25 November *

COMPUTING SEMINAR

at 11.00hrs – IT Auditorium, bldg 31/3-005

C++ Code Analysis: an Open Architecture for the Verification of Coding Rules

by Paolo TONELLA / Istituto Trentino di Cultura-IRST,
Trento/Italy

The analysis of C++ code is the basic building block of the collaboration between ITC-IRST and CERN/ALICE, aimed at improving the quality of the software by exploiting the information that can be automatically gathered from the code.

The first objective of the collaboration is the development of a coding rule check tool. Successive steps will include a reverse engineering module and an intelligent refactoring tool. Since all planned applications, and possibly also those not yet considered, share a common analysis bulk, particular attention was devoted to the development of an open architecture for the analysis of C++ code. In this talk the

adopted architectural solutions are presented and discussed, highlighting their generality, the possibilities of extension that they offer, and the way details could be encapsulated within packages, so that a clear and sharp interface between the subsystems is defined. The peculiarities of the C++ language are also described, together with the way they were approached and the state of the current implementation.

Short biography

Paolo Tonella received his laurea degree cum laude in Electronic Engineering from the University of Padua, Italy, in 1992, and his PhD degree in Software Engineering from the same University, in 1999, with the thesis "Code Analysis in Support to Software Maintenance". Since 1994 he has been a full time researcher of the Software Engineering group at IRST (Institute for Scientific and Technological Research), Trento, Italy. He participated in several industrial and European Community projects on software analysis and testing. His current research interests include software engineering, reverse engineering, object oriented programming and code analysis.

Organiser : F.Gagliardi / IT

* Please note unusual DAY and TIME

Friday 26 November

SCIENCE, TECHNOLOGY & INDUSTRY SEMINAR

at 11.00 hrs – Conference Room, bldg 40/S2-B01

From research to actual use via technology transfer – the background and role of a patent attorney

by Dorothee WEBER-BRULS / Boehmert & Boehmert, Frankfurt am Main

All patent attorneys are originally scientists who had, after the completion of their studies, worked as a scientist for at least one year, and then became acquainted with intellectual property by training on the job for around three years

to become a German patent attorney and for four years to become a European patent attorney, after final examinations. Therefore, patent attorneys have acquired an education adapted to become a link or interface between research and spin-off of technology into industrial applications, either within one company, between different companies or between a research center and a company.

About the speaker

Dorothee Weber-Bruls, Dipl.-Phys. Dr.rer.nat., (German Patent Attorney, European Patent and Trademark Attorney, Partner) studied physics and geophysics at the University of Frankfurt and specialized in solid state physics. After graduation she worked at Max-Planck-Institute (Grenoble), Institute Laue-Langevin (Grenoble) as well as Risø National Laboratory, and as a teaching fellow at the University of Frankfurt (PhD in physics), being especially involved in materials science, magnetism, superconductivity as well as measurement and control engineering. Dorothee Weber-Bruls is still particularly interested in these areas of technology

POUR INFORMATION / FOR INFORMATION

LAPP – Laboratoire d'Annecy de physique des Particules

F74941 – Annecy-le-Vieux

Informations : Frédérique MARION, tél. 04 50 09 16 00

Vendredi 19 novembre

à 14.00 h – Auditorium du LAPP

Effet des radiations sur les circuits électroniques

par Francis ANGHINOLFI / CERN-EP-MIC

1. Effets des radiations sur les circuits logiques
2. Effets des radiations sur les circuits analogiques
3. Effets des particules individuelles fortement ionisantes (SEE)
4. Exemples de circuits durcis par technologie ou par design
5. Récapitulatif

EDUCATION SERVICES EDUCATIFS



Information sur les cours, dates et places disponibles sur WWW:
Information about the courses, dates and places available on WWW :
<http://www.cern.ch/Training/>

ACADEMIC TRAINING

LECTURE SERIES

FOR POSTGRADUATE STUDENTS

15, 16, 17, 18 & 19 November

from 11.00 to 12.00 hrs – Auditorium, bldg 500

QCD

by B. WEBBER / CERN-TH

The lectures will first cover the basic properties of QCD: the Lagrangian, the running coupling, asymptotic freedom and colour confinement. Next, some examples of perturbative calculations in electron-positron physics (total cross sections and event shapes) will be given. The "parton branching" approach will then be used to derive the evolution equations for hadron structure functions and jet fragmentation functions. Comparisons with data on deep inelastic scattering and jet production will be given. Hadronization models will be described and compared with recent data. If time permits, non-perturbative corrections to perturbative QCD predictions will be also be discussed.

ACADEMIC TRAINING

LECTURE SERIES

FOR POSTGRADUATE STUDENTS

22, 23, 24, 25 & 26 November

from 11.00 to 12.00 hrs – Auditorium, bldg 500

Standard Model Physics

by G. ALTARELLI / CERN-TH

Introduction. Structure of gauge theories. The QED and QCD examples. Chiral theories. The electroweak theory. Spontaneous symmetry breaking. The Higgs mechanism. Gauge boson and fermion masses. Yukawa couplings. Charges current couplings. The Cabibbo-Kobayashi-Maskawa matrix and CP violation. Neutral current couplings. The Glashow-Iliopoulos-Maiani mechanism. Gauge boson and Higgs couplings. Radiative corrections and loops. Cancellation of the chiral anomaly. Limits on the Higgs mass. Comparison with experiment. Problems of the Standard Model. Outlook.