

# SEMINARS SEMINAIRES

## Monday 27 November to 1 December

### WORKSHOP ON RECENT DEVELOPMENTS IN THEORETICAL PHYSICS

#### STU-Dualities and Non-Perturbative Phenomena in Superstring and Supergravity

In the last year, important steps have been made towards understanding non-perturbative phenomena in supersymmetric gauge theories and superstring theory.

Extended objects of different nature, generalizing the more familiar notion of point-like electrically charged particles and magnetic monopoles, and arising as solutions of supergravity equations, play a major role in unveiling non-perturbative physics. In this context, the concept of duality, a symmetry relating the weak and strong coupling regimes of quantum field theories, has come to play a basic role. It is hoped that these results will shed light on some fundamental questions of particle physics, such as confinement, the connection between the electroweak and supersymmetry-breaking scales, the relation between low-energy physics probed by present-day particle smashers and the Planck-scale physics that dominated the very early stages of the Universe.

The Workshop that will be held next week will convene at CERN leading researchers from major European universities and laboratories, to discuss the most recent results and review the situation of the field.

*For any information, please contact the Workshop Secretary  
Nanie Renault / 4222 / E-mail address: [renault@cernvm.cern.ch](mailto:renault@cernvm.cern.ch)*

*Organized by: Albrecht Klemm & Costas Kounnas/ CERN-TH*

## Monday 27 November

### TECHNICAL SEMINAR

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

#### Multiple Target Tracking and Vertexing Algorithms for HEP

by Jean-François PUSZTASZERI / CERN-ECP

A comparative review of mainstream track and vertex finding algorithms currently used in High Energy Physics will be presented, with emphasis on realistic examples to underline strengths and weaknesses of each method. This will introduce lesser-known Multiple Target Tracking algorithms (Kalman filters with track splitting, Multiple Hypothesis Tracking and Joint Probabilistic Data Association Filters), along with strategies for applying these methods on dense reconstruction problems. The presentation of novel combinatorial hit assignment and topological vertex search algorithms, incorporating these ideas and tested on ALEPH and CDF events, will conclude the discussion.

## Tuesday 28 November

### ISOLDE COLLABORATION OPEN MEETING

at 09.00 hrs – ECP Conf. Room, bldg 13/2-005

Opening of the Meeting by G. Huber

Experiments with polarized  $^8\text{Li}$  atomic beams by D. Fick

Status of the HRS separator by E. Kugler

New target developments by J. Lettry

Status of the REX-ISOLDE project by D. Habs

## Tuesday 28 November

### TECHNICAL PRESENTATION

at 10.00 hrs – CN Auditorium, bldg 31/3-004&5

#### SUN MICROSYSTEMS UltraComputing Announcements

by Philippe HOFMANN & Jean-Luc BOCQUET / SUN  
Switzerland

Highlighting today's announcement is the unveiling of a comprehensive line of powerful new systems, including the Sun UltraTM 1 and Sun Ultra 2 families. The Ultra 2 workstation today becomes the fastest workstation in the industry. The new desktop systems target are technical users and others in computationally intense environments. They outperform the fastest 3D graphics and imaging systems from the competition's top-performing 3D mechanical design machines. The UltraComputing architecture boasts a number of technology firsts that allow users to meet the requirements for high-speed networking, collaborative computing and the use of complex multimedia data.

New ULTRAc computing products : ULTRAc computing technologies, Ultra hardware architecture, ULTRA 1 & 2 Workstations & servers product line, Software, new announcements, Software developments tools overview: Workshop 2.0 & NEO, Solaris 2.5

**Prices :** General repricing info (SPARCStation 20, Memory, Storage), ULTRA Upgrades ( Workstations and Servers )

Ultra 1 Creator 3D demos: imaging, 3D solid graphics, video General Information. Sun also offers upgrade paths for new ULTRA systems.

*Organiser : S. Cannon / CN / 5036*

## Wednesday 29 November

### THEORETICAL SEMINAR

at 14.00 hrs – TH Conference Room

#### The fractal structure of the Universe

by L. PIETRONERO / Univ. La Sapienza, Rome

We use the methods of modern statistical physics to reanalyze the space distributions of galaxies and clusters. Contrary to the usual analysis, our results show that the distribution of visible matter in the Universe is characterized by long range, fractal correlations, up to the present observational limits, about 1000 Mpc (one quarter of the Hubble radius) without any evidence towards homogenization. These results have a profound impact on our knowledge of the Universe and on the theoretical methods that one should use for its description.

## Wednesday 29 November

### COMPUTING SEMINAR

at 16.00 hrs – CN Auditorium, bldg 31/3004&5

#### ROOT : an object oriented framework for large scale data analysis.

by René BRUN / NA49

The ROOT system, which is currently being developed in the context of the NA49 experiment, provides on one hand the functionality of conventional programs like PAW and MINUIT and on the other hand a complete new set of tools

and features that help the design and documentation phases of large C++ based projects. During the seminar, an interactive demo will show the most important features of ROOT:

- Histogramming, Object/N-tuples and minimization.
- 2D and 3D graphics (direct object manipulation and real-time 3D geometric rendering).
- User interface (command-line, GUI and batch) and the C++ interpreter.
- The I/O system (persistent objects on hierarchical direct-access and sequential files).
- Object browsing and the "automatic" generation of HTML documentation.

Organiser : G.Folger / CN

## Thursday 30 November

### UMTF COMPUTING TUTORIAL

10.00-12.00 hrs – CN Auditorium bldg 31/3004&5

#### How to Set Up Your Unix Shell Environment

by A.TADDEI / CERN-CN

This is the sixth tutorial in a regular lecture series organized by the User Migration Task Force of the CN division. It is targeted to users who need to migrate from CERNVM or any other other platform to Unix and need to acquire enough knowledge for their everyday work on one of the Work Group or PLUS Servers or any other workstation running the recommended HEP Unix environment.

This tutorial is dedicated to the main interface with a UNIX system: the shell. Given the variety of choices and options, it becomes necessary to select and recommend only one subset. The talk will therefore concentrate in presenting that selection and basically answer the following questions:

- what is a shell and how you can use it?
- what can you customise and how?
- what does the HEPiX environment mean to you at CERN?
- what you shouldn't do?
- where you can find and use other information sources?

Further information may be found in WWW, including the slides of the lecture: <http://consult.cern.ch/umtf/training>  
The program will continue next year covering topics as scripting languages like Perl and Tk/Tcl, X sessions, mailing lists, etc.

The timetable for these will be published in due course.

## jeudi 30 novembre

### PRESENTATION TECHNIQUE

10h00-12h00 & 14h00-16h00, bât. 17/1-007

#### Compatibilité Electro-Magnétique (CEM)

Séminaire, en deux parties, par Schaffner-Altrac AG (CH)

- 10.00 Introduction sur la CEM, perturbations électromagnétiques (les sources et les origines), les directives actuelles et les normes en Europe, principes de filtrages, aperçu sur les filtres Schaffner
- 14.00 Démonstration avec les instruments de mesures

Langues: anglais, français

Renseignements: M. Diraison / FI-A / 4585

## Thursday 30 November

### ISOLDE SEMINAR

at 16.00 hrs – TH Conference Room

#### Mass measurement of $^{100}\text{Sn}$ and other exotic nuclei at GANIL

by Marielle CHARTIER / GANIL, Caen

The masses of nuclei far from stability are of particular interest and many methods of varying precision have been developed to undertake their measurement. A direct time-of-flight technique in conjunction with the SPEG spectrometer has been used at GANIL to measure the masses of proton-rich nuclei in the mass region  $A \approx 60-80$ , produced via the fragmentation of a  $^{78}\text{Kr}$  beam of a  $^{nat}\text{Ni}$ , using SISSI. This well known technique has been used in a series of previous mass measurements for lighter neutron-rich nuclei with a resolution of  $\sim 3 \times 10^{-4}$ . The data analysis is in progress, and it is envisaged that some masses will be determined, providing input for astrophysical modelling of the rp-process and information relevant to the nuclear structure in a region of high deformation. Two other experiments aimed at measuring the masses of  $a=100$  isobars in the vicinity of  $^{100}\text{Sn}$  have recently been performed, using the second cyclotron of GANIL (CSS2) as a high resolution spectrometer. The secondary ions were produced via the fusion-evaporation reaction  $^{50}\text{Cr} + ^{58}\text{Ni}$ . This original method has shown excellent mass resolution ( $10^{-5}$ ) for the simultaneous acceleration of light secondary ions. A first experiment provided very encouraging preliminary results on the masses of  $^{100}\text{Cd}$  and  $^{100}\text{In}$  (measured for the first time, with a precision of  $5 \times 10^{-6}$ ). In the second experiment (July 1995) we used the same method with a slightly different set-up and the doubly magic nucleus  $^{100}\text{Sn}$  was also produced and accelerated (about 12 events were observed). The results for the masses of  $^{100}\text{In}$  and  $^{100}\text{Sn}$  will be presented and discussed.

## Friday 1 December

### PLENARY ECFA MEETING

at 10.00 hrs – Council Chamber

- 10.00 1. Approval of the Draft Minutes of the Fifty-seventh Plenary ECFA Meeting  
2. Adoption of the Draft Agenda  
3. Chairman's Report  
4. Status Report on LHC  
(C.H. Llewellyn Smith and L.R. Evans)  
5. Report on HEPCCC Activities (D. Jacobs)
- 13.00 Lunch
- 14.30 6. HERA: Status and Prospects (A. Wagner)  
7. Report on LEP and LEP2 (K. Hübner)  
8. Report on ACCU (K. Peach)  
9. Timetable for ECFA Meetings 199  
10. Any Other Business
- 17.00 End of meeting

## Friday 1 December

### MEETING ON PARTICLE PHYSICS PHENOMENOLOGY

at 14.00 hrs – TH Conference Room

#### Constituent quarks from QCD

by M. LAVELLE / Univ. Autònoma, Barcelona

Starting from the observation that colour charge is only well defined on gauge invariant states, we construct perturbatively gauge invariant, dressed quarks. Explicit calculations show

that an infra-red finite mass-shell renormalization scheme of the gauge invariant dressed propagator is possible and quark condensate effects generate a gauge invariant, running mass term in this propagator. We explain how these fields may be combined to form hadrons and how the interquark potential may be directly calculated with their help. The onset of confinement is identified with an obstruction to building a non-perturbative dressing. Various implications of this work are discussed.

## Friday 1 December

### PRESENTATION

14.00 to 17.00 – AT Auditorium, bldg 30, 7<sup>th</sup> Floor

**Société Européenne de Propulsion (SEP)**

**and Empresarios Agrupados (EA)**

by Daniel BALLEZ / SEP

1. Introduction and summary of previous relations with CERN
2. SEP's general presentation and capabilities
3. EA's general presentation and capabilities
4. SEP: Cryogenics (capabilities for design, testing, etc.)
5. SEP: Materials (expertise low and high temperature)
6. SEP: RAMS
7. EA: Project Management
8. EA: Integrated Logistic Support and Document Management
9. EA: Construction Supervision
10. EA: Support Services (operation & maintenance)
11. Debate: Ways of cooperation with CERN

Information : Y. Ninet / MT / 3268

## Lundi 4 décembre

### PRESENTATION TECHNIQUE

09h00-17h00 – parking, bât. 904, site de Prévessin

**Une vaste gamme de composants électroniques et électriques, d'appareils de test et de mesure**

par Farnell Electronic Components (GB),

une Division de Farnell (France) Sarl

Alimentations, convertisseurs cc/cc, filtres, transils, VDR, inductances, tores, produits de blindage, transformateurs, matériel de contrôle et d'asservissement, borniers, rails DIN, régulateurs de température, capteurs (température, niveau, humidité, etc.), détecteurs de proximité, ventilateurs, câbles et accessoires, boîtiers, coffrets, commutateurs, fins de course, alarmes, condensateurs (électrolytiques, polyester, tantale, etc.), connecteurs (audio, vidéo, coaxiaux, multipôles, circulaires, HE10, DIN41612, etc.), Multimètres, oscilloscopes, générateurs de fonctions, fusibles, cordons informatiques, programmeurs, effaceurs de mémoires, Leds, voyants afficheurs, optocoupleurs, outils (petit outillage à main et outillage mécanique), data books, piles, accumulateurs, produits chimiques, relais, électro-aimants, résistances, potentiomètres, trimmers, supports de CI, dissipateurs, circuits intégrés (logiques, réseaux programmables, mémoires, microcontrôleurs, microprocesseurs, co-processeurs, kits de démarrage, lignes à retard, quartz, CAN, CNA, amplis, drivers, régulateurs, etc.), composants discrets (diodes, ponts redresseurs, thyristors, triacs, transistors, etc.), fers à souder, stations de soudage, temporisateurs, indicateurs de tableau, vis, entretoises, circuits imprimés, etc.

Le catalogue, édité deux fois par an, contient 22 500 produits,

en stock à Villefranche/Saône, livrables sous 24 heures, sans minimum de commande. Il s'adresse aux ingénieurs et techniciens qui ont des besoins urgents et diversifiés en composants. A disposition, une ligne technique directe, au bout de laquelle un technicien les conseillera pour le choix du bon produit.

Langue: français

Renseignements: M. Diraison / FI-A / 4585 &

L. Abel / FI-A / 9561

## Monday 4 December

### DETECTOR SEMINAR

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

**Real-time pulse parameter extraction from a few samples**

by Vasile BUZULOIU / Polytechnic Institute Bucuresti

The seminar aims at describing a solution to a problem of large interest for processing HEP signals, namely precise and fast (i.e. real-time 1st level triggering) recovery of the parameters of a pulse from a few samples. We shall discuss the principle, the handling of noisy data, implementation issues, and 2-D extension for super resolution in, e.g., detecting the movement in a sequence of images.

## Monday 4 December

### PPE SEMINAR

at 16.30 hrs – Auditorium

**Results from Deep Inelastic ep Scattering at HERA**

by Richard NISIUS / CERN PPE

Since 1992 the experiments H1 and ZEUS are studying ep interactions at the HERA collider. HERA is an ideal machine to investigate deep inelastic ep scattering and scattering of quasi real photons off protons. In this presentation selected results from deep inelastic scattering will be shown. The measurement of the structure function  $F_2(x, Q^2)$  will be discussed. The HERA data spans over a large range of momentum transfers  $Q^2$  and Bjorken  $x$ , thereby extending the range measured by the fixed target experiments BCDMS and NMC to larger  $Q^2$  and lower  $x$  values. The present understanding of events which show a large rapidity gap between the directions of flight of the incoming proton and the hadron observed closest in rapidity to the proton will be reviewed.

The presentation of the results of the analysis of the hadronic final state will concentrate on the determination of the gluon density in the proton and the measurement of the strong coupling constant  $\alpha_s$  as a function of  $Q^2$ .

## Wednesday 6 December

### TECHNICAL PRESENTATION

09.00 to 16.30 hrs – Auditorium, Bldg 864/1-D02

**Materials and specialised services for research laboratories**

by Goodfellow Cambridge Ltd

Language : English, French, German

Information : L. Abel / FI-A / 9561

### Wednesday 6 December

#### UMTF COMPUTING TUTORIAL

10.00-12.00 hrs – CN Auditorium bldg 31/3004&5

**Basic Unix Commands / Jobs & Processes**

by J.H. PETERS / DESY & CERN

### Thursday 7 December

#### LABVIEW USERS MEETING (CERN & GENEVA)

at 9.00 hrs – AT Auditorium, bldg 30, 7<sup>th</sup>

All LabVIEW users, and developers planning computer based test systems, are invited to the 2<sup>nd</sup> annual Users Meeting:

- 09.00 1. Introduction (V. Carter)  
2. New High Speed VXI-MXI-2 interfaces  
(J. Kimmery, NI-USA)  
3. Virtual Bench Instruments (S. Zanetti, NI-CH)  
4. Measure for Excel (S. Zanetti)  
*Coffee Break*  
10.30 5. Signal Processing Suite (A. Loule, NI-CH)  
6. HiQ 2.2 for Macintosh (A. Loule)  
7. The LHC String Data Acquisition System  
(A. Rijllart, CERN-AT)  
8. Windows 95 in Test and Measurement  
(R. Kalbermatter, NI-CH)  
11.45 9. LabVIEW version 4.0 (R. Kalbermatter)  
12.15 Questions and answers

Organizer: F. Soso/CN

### Thursday 7 December

#### CERN ASTROPHYSICS SEMINAR

at 16.30 hrs – Auditorium

**Elements and isotopes at high redshifts**

by R.F. CARSWELL / IoA Cambridge, UK

### Friday 8 December

#### SL SEMINAR

at 11.00 hrs – SL Auditorium, Prévessin, bldg. 864

**Luminosity and Beta Function Measurement at LEP**

by P. Castro GARCIA / Univ. Valencia & CERN

### POUR INFORMATION / FOR INFORMATION

#### UNIVERSITY OF GENEVA

Particle Physics Department

24, quai Ernest-Ansermet

1211 Geneva 4

Tel. 022 702 6273

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### Mercredi 29 novembre

#### SEMINAIRE DE PHYSIQUE CORPUSCULAIRE

à 17.00 h – Auditoire Stuckelberg

**Le spectromètre magnétique Alpha (AMS)**

par Nicolas PRODUIT / Université de Genève

L'absence apparente d'antimatière dans l'univers est un des grands problèmes non résolu de la physique des particules et de la cosmologie. Les théories qui tentent d'expliquer cette simple observation sont hautement spéculatives. AMS sera le premier spectromètre magnétique important placé en orbite hors de l'atmosphère. Il permettra de chercher l'antimatière dans les rayons cosmiques avec une sensibilité dix mille fois meilleure que les mesures actuelles. Ceci permettra de savoir s'il existe une quantité significative d'antimatière dans l'univers.

## EDUCATION SERVICES EDUCATIFS

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### ENSEIGNEMENT GÉNÉRAL

Tél. 5811

### Jeudi 30 novembre

à 13.00 h – Amphithéâtre

**Science pour tous**

par Rafel CARRERAS

### ACADEMIC TRAINING

Tel. 3127

### LECTURE SERIES

#### FOR POSTGRADUATE STUDENTS

### 4, 5 & 6 December

11.00 to 12.00 hrs – Auditorium

**Supersymmetry and particle physics**

by H.P. NILLES / Technische Univ. München, D

We give an introduction to supersymmetry and supergravity and review attempts to construct models in which the breakdown scale of weak interactions is related to supersymmetry breakdown. Theoretical and phenomenological properties of supersymmetric extension of the SU(3) × SU(2) × SU(1) standard model and its grand unified versions are discussed in detail.