

SEMINARS SEMINAIRES

Monday 10 May

COSMOLOGY WORKSHOP

at 14.00 hrs – TH Conference Room, bldg 4

Lambda-term in the Universe - discovering a new physical interaction

by A.A. STAROBINSKY / Landau Institute, Moscow

Recent observational data on supernovae at large redshifts, as well as numerous previous arguments, strongly support the existence of a new type of dark matter in the Universe. This form of matter described by a positive lambda-term ("cosmological constant") has a strongly negative pressure and remains unclustered at all scales where clustering of baryons and dustlike cold dark matter is seen. The simplest phenomenological way to describe it, borrowed from the inflationary scenario of the early Universe, is to introduce a scalar field (lambda-field, also sometimes called quintessence) with some self-interaction potential, minimally coupled to gravity and very weakly coupled (if at all) to matter fields. This is possible if and only if the weak energy condition is satisfied for this kind of matter that has to be verified from observations. If so, then the required potential can be unambiguously determined from the following observational data: either from the luminosity distance as a function of redshift (given the present density of dustlike matter in terms of the critical one additionally), or from the behaviour of density perturbations in dustlike matter component as a function of redshift (given the Hubble constant). Generally, the potential need not be constant, so the lambda-term may be time-dependent, though not too strongly. If, however, future observations show that the weak energy condition is not satisfied for the lambda-field, more complicated models (e.g. with a non-minimal coupling to the gravitational field) will be necessary. Thus, high quality cosmological data expected in near future will provide us with phenomenological knowledge about properties of this new interaction.

Mardi 11 mai

IT INFORMATICS TUTORIAL

14.00-16.00 h – Amphithéâtre IT, bât. 31/3-004

Introduction à Corel Draw et à Corel Photopaint

par Alberto PACE / CERN-IT

Corel Draw et Corel PhotoPaint sont deux programmes qui permettent de créer des images et dessins qui peuvent être ajoutés dans vos documents.

La présentation montrera, avec des nombreux exemples, comment on conseille d'utiliser Draw et PhotoPaint efficacement pour créer des diagrammes, des images ou des animations, et comment on peut ajouter ces dessins dans vos documents Word ou dans vos pages web en format JPEG, GIF et animated-GIF.

La présentation utilisera la version de Corel installée sur NICE 95 et NICE NT mais ne demandera aucune connaissance préalable ni du PC, ni de Windows. La plupart des informations qui seront données s'appliquent aussi à d'autres plateformes (UNIX et Macintosh) et à des installations de Corel faites par l'utilisateur (PC à la maison, etc.)

Vous pouvez aussi consulter

For information on these seminars, please see

<http://wwwas.cern.ch/Bulletin/Seminars/current.html>

The presentation will be given in French. Questions in English will be answered in English.

Information: <http://wwwinfo.cern.ch/support/training>

Organisers: M.Marquina and R.Ramos /IT-User Support

Wednesday 12 May

PS SEMINAR

at 11.00 hrs – PS Auditorium, bldg 6/2-024

Accelerator Mass Spectrometry — a Versatile Tool for the Measurement of Long-lived Radionuclides

by Walter KUTSCHERA / VERA Laboratory, Institut für Radiumforschung und Kernphysik, University of Vienna, Austria

The use of long-lived radionuclides as a means to study our environment at large entered a new dimension when Accelerator Mass Spectrometry (AMS) entered the field. Counting atoms rather than decays increased the detection sensitivity by many orders of magnitude. This allows one to use many cosmogenic and anthropogenic radionuclides such as ^{10}Be , ^{14}C , ^{26}Al , ^{36}Cl , ^{41}Ca , ^{53}Mn , ^{59}Ni , ^{60}Fe , ^{81}Kr , ^{129}I , ^{205}Pb , ^{236}U , ^{244}Pu in ways never possible by decay counting. The talk will first describe the method of AMS using the Vienna Environmental Research Accelerator (VERA) as an example for a modern AMS facility, and then discuss various applications in the seven spheres of our environment: atmosphere, biosphere, hydrosphere, cryosphere, lithosphere, cosmosphere, and technosphere.

Organiser: B. Autin/PS

Wednesday 12 May

THEORETICAL SEMINAR

at 14.00 hrs – TH Conference Room, bldg 4

Colour Superconductivity in QCD at high density

by Mark ALFORD / M.I.T. Cambridge

Recent theoretical investigations indicate that high density matter is far more interesting than previously believed: the strong force is broken by "colour superconductivity", the electromagnetic charges of the fundamental particles are changed, and chiral symmetry is always broken at sufficiently high density. I will explain why we expect these exotic behaviours of matter under extreme conditions.

From Monday 17 to Thursday 20 May

HEAVY ION THEORY

All talks to take place in the Council Chamber, bldg 503

PROGRAMME

Monday 17 May

- 09:00 - 09:45 *Miklos Gyulassy*
Status and open problems of the heavy-ion program
- 10:00 - 10:45 *Frank Wilczek*
Continuity of quark and hadron phases
- 11:30 - 11:55 *Thomas Schaefer*
More continuity of quark and hadron matter

12:10 - 12:35 *Krishna Rajagopal*
Locking and unlocking color and flavor

12:50 - 13:05 *Mark Alford*
Color superconductivity and the strange quark

Lunch

14:30 - 14:55 *Jac Verbaarschot*
The infrared limit of the QCD Dirac spectrum

15:10 - 15:35 *Ismail Zahed*
Chiral disorder in QCD and phase transitions

15:50 - 16:05 *Greg Carter*
Quarks in the instanton vacuum at nonzero matter density

Coffee Break

16:45 - 17:10 *Dirk Rischke*
QCD at high baryon density: color superconductivity, parity violation, and supernovae

17:25 - 17:40 *Juergen Berges*
Color superconducting strange quark matter

17:45 - 18:00 *Boris Kerbikov*
Nonperturbative QCD vacuum and colour superconductivity

Tuesday 18 May

09:00 - 09:25 *Larry McLerran*
Semiclassical approach to small x physics

09:45 - 10:10 *Alex Kovner*
RGE for small x physics

Coffee Break

11:00 - 11:25 *Heribert Weigert*
Nonlinear effects at small x

11:45 - 12:10 *Alexander Krasnitz*
High-energy nuclear collisions: a non-perturbative numerical description of transverse dynamics

Lunch

13:50 - 14:15 *Yuri Kovchegov*
Nuclear structure functions including multiple pomeron exchange

14:30 - 14:55 *Kari Eskola*
Nuclear parton distributions - a DGLAP analysis

15:10 - 15:25 *Ina Sarcevic*
Parton distributions in nuclei at small- x

Coffee Break

16:00 - 16:25 *Rolf Baier*
Parton energy loss in dense matter

16:40 - 17:05 *Haitham Zaraket*
Lepton and photon production in a hot quark-gluon plasma

17:20 - 17:35 *Mike Strickland*
Hard-thermal-loop resummation of the free energy of a hot gluon plasma

17:40 - 18:40 Discussions

Wednesday 19 May

09:00 - 09:25 *Jean-Paul Blaizot*
The Boltzmann equation for the QCD plasma

09:45 - 10:10 *Anton Rebhan*
Quasiparticle approach to the entropy in QCD

Coffee Break

10:50 - 11:15 *Michel Tytgat*
Parity odd domains in hot QCD

11:30 - 11:55 *Mikko Laine*
The phase diagram of the electroweak theory

12:10 - 12:35 *Misha Stephanov*
Event-by-event fluctuations in heavy ion col-

lisions and the QCD critical point

Lunch

14:00 - 14:25 *Gordon Baym*
Physics of neutron stars

14:40 - 15:05 *Jes Madsen*
Quark matter signatures from pulsars or the early Universe ?

15:20 - 15:45 *Nick Mavromatos*
Thermodynamics of AdS black holes and the QCD phase transition

Coffee Break

16:15 - 16:40 *Stefano Frixione*
Heavy flavour production: a review

16:55 - 17:20 *Elena Ferreira*
J/ ψ suppression in the dual parton model: Is there a break in the J/ ψ cross-section

17:35 - 18:35 Discussions

Thursday 20 May

09:00 - 9:25 *Jürgen Schukraft*
Physics with the ALICE detector

09:45 - 10:10 *Berndt Müller*
Physics at RHIC

Coffee Break

11:00 - 11:25 *Edward Shuryak*
QCD phase transitions and their implications for space-time picture at RHIC/LHC

11:45 - 12:10 *Heinz Sorge*
Elliptic flow as an early stage signature

Lunch

14:00 - 14:25 *Henning Heiselberg*
The physics of non-central collisions at high energies

14:45 - 15:10 *Joe Kapusta*
The rho meson at finite temperature and density

Coffee Break

16:00 - 16:15 *Charles Gale*
Formation time effects in Drell-Yan and J/ Ψ production in high energy proton nucleus interactions

16:20 - 16:35 *Carlos Salgado*
Baryon and antibaryon production in heavy ion collisions

16:40 - 17:15 *Helmut Satz*
Deconfinement patterns

Tuesday 18 May

CERN PARTICLE PHYSICS SEMINAR

at 16.30 hrs – Auditorium, bldg 500*

Superheavy elements

by Yuri OGANESEAN / JINR, Dubna, Russia

A fundamental outcome of macro-microscopic theory is the prediction of an “island of stability” of superheavy elements beyond those previously discovered. We will report on experiments carried out in Dubna which seem to confirm this hypothesis. In the $^{48}\text{Ca} + ^{244}\text{Pu}$ reaction, the decay of a nucleus was observed as the sequential emission of 3 α -particles and spontaneous fission. The decay chain lasts about 34 min. It originates from the decay of a new superheavy nucleus, most probably $^{289}114$ ($T_\alpha \sim 20$ s), formed in the 3n-evaporation channel with a cross section of ~ 1 pb. In a second experiment, involving the $^{48}\text{Ca} + ^{242}\text{Pu}$ reaction, another decay chain was observed, lasting about 9 min and comprising one α -decay and spontaneous fission. It is related to the decay of the lighter isotope $^{287}114$ ($T_{s.f.} \sim 3$ min). The significant increase of the lifetime of the observed nu-

clei (by a factor of $\sim 10^6$) with respect to the lifetimes of the heaviest known nuclides may be considered as a direct experimental evidence of the existence of the "island of stability" of superheavy elements.

Organiser : Jasper Kirkby / EP Division

* Tea & coffee will be served at 16.00 hrs.

Wednesday 19 May

THEORETICAL SEMINAR

at 14.00 hrs – TH Conference Room, bldg4

Quark masses, unitarity triangle and CP violation in the Standard Model

by Guido MARTINELLI / Roma 1, La Sapienza, Roma

Recent determinations of light and heavy quark masses, matrix elements of the CKM matrix and CP-violating phases are presented. The impact of these results on our understanding of CP violation in the Standard Model is discussed. Theoretical predictions are compared with the experimental measurements, in particular to the latest determination of ϵ'/ϵ by the KTeV collaboration and of $\sin 2\beta$ by CDF. Also $\bar{K}^0$ - K^0 and B^0 - B^0 mixing in the Standard Model and beyond is briefly discussed.

Thursday 20 May

TECHNICAL PRESENTATION

09.00 to 12.30 hrs – LHC auditorium bldg. 30-7-018

Design for testability with JTAG-BSCAN

by Rik DOORNEWEERT, Jean-Luc BERSET / JTAG Technologies B.V. and COMPUTER CONTROL

With the ever increasing complexity of electronic components and boards, new test methods have become more and more important. One of these methods is Boundary-scan, also known as IEEE Standard 1149.1. Boundary-scan is an integrated method for testing interconnects on printed circuit boards. It is applicable in product design, prototype debugging, field service, and installation.

PRESENTATION from 09.30 to 12.00 hrs

- Introduction (Computer Control SA & JTAG Technologie)
- Tests methods and their characteristics
- Including JTAG in designs
- Products overview (interface with Cern tools)
- Experiences from using Boundary-Scan
- Other uses of Boundary-Scan: in situ programming
- Q & A

at 14.00 hrs

- Discussion (round-table)
- Demo

Organiser: S. Brobeckner/IT (tel: 78693)

Language : English

Jeudi 20 mai

PRÉSENTATION TECHNIQUE

10.00 - 17.00 hrs – Parking Bât. 252 - Camion de démonstration

Appareils de soudage T.I.G. et M.I.G

par M. C. SCHAFFERS/Hultegger SA (CH) Rep. Migatronic Danemark

La Maison Hultegger présenteront sur leur camion de démonstration, spécialement équipé à cet effet, sa nouvelle gamme d'appareils de soudage T.I.G. et M.I.G.

Le nouveau modèle BDH programmable dispose d'un microprocesseur offrant une grande souplesse de programmation, dont la compréhension et particulièrement simplifiée. L'appareil débite une stabilité d'arc exceptionnelle. La version triple permet, par exemple, de souder la passe de fond et T.I.G. puis effectuer le remplissage en M.I.G. L'équipement permet le soudage en synergique et en pulsé.

Pour la documentation, le logiciel Infoweld, programme basé sur PC, permet d'enregistrer les paramètres réels pour chaque soudure.

Langues : français, anglais

Information : S.Shearer /SPL / 76360

Thursday 20 May

THURSDAY SEMINAR

at 14.00 hrs – TH Conference Room

Large rescaling of the Higgs condensate: theoretical motivations and lattice results

by M. CONSOLI / University of Catania

In the Standard Model the Fermi constant is associated with the vacuum expectation value of the Higgs field $\langle F \rangle$, 'the condensate', usually believed to be a cutoff-independent quantity. General arguments related to the 'triviality' of F^4 theory in 4 space-time dimensions suggest, however, a dramatic renormalization effect in the continuum limit that is clearly visible on the relatively large lattices available today. The result can be crucial for the Higgs phenomenology and in any context where spontaneous symmetry breaking is induced through scalar fields.

Thursday 20 May

SL SEMINAR

at 16:00 hrs* - SL Auditorium, bld. 864

The LHC Dynamic Aperture

by Jean-Pierre KOUTCHOUK / CERN

In 1996, the expected field errors in the dipoles and quadrupoles yielded a long-term dynamic aperture of some 8 sigma (minimum). The target was raised to 12 sigma to account for the limitations of our model (imperfections and dynamics). From tracking multipole by multipole, exact and empirical scaling laws and tracking a large number of possible LHC's, a specification for the field imperfections yielding the target dynamic aperture was deduced. The gap between specification and expected errors is being bridged by :

- i) the minimization of the imperfections, made possible by the new and more flexible design of the dipole coil (6 blocks),
- ii) a balance between geometric and persistent current errors taking into account the time-dependent effects, iii) additional correction circuits (a₃, b₄, a₄). With the goal in view, the emphasis has now turned to the sensitivity of the dynamic aperture to the optical parameters. This tracking approach is complemented by the study of the distortion of the dynamics at the smaller amplitudes allowed by the collimation system; the aim is to minimize it by an optimized distribution of the betatron phase advance. At collision energy, the dynamic aperture is limited by the field imperfections of the low-beta triplets, enhanced by the crossing angle. Without correction, the dynamic aperture is about 8

sigma. After correction of the most important aberrations, it reaches a minimum of 10 sigma.

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

Organiser: Werner Herr / SL Division

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

Friday 21 May

CERN HEAVY ION FORUM

at 9:00 hrs - Conference Room 40-S2-A01

There will be two Heavy Ion Forum events on this day

1) The QCD phase diagram, event-by-event fluctuations and flow

by Edward SHURYAK / SUNY Stony Brook

Because too many interesting things are going on now, I have tried to squeeze three different subjects into one talk. The first is a brief summary of color super-conductivity. During the last year we learned that instanton-induced forces can not only break chiral symmetry in the QCD vacuum, but also create correlated scalar diquarks and form new phases, some similar to the Higgs phase of the Standard Model. The second issue I discuss is the remnant of the so called *tricritical* point, which in QCD with physical masses is the endpoint of a first order transition. I will argue that exchange of sigmas (which are massless at this point even with quark masses included) create interesting event-by-event fluctuations, which can be used to locate it. Finally I describe first results in *flow* calculations for non-central heavy-ion collisions at RHIC. It was found that it is extremely sensitive to the Equation of State (EOS). Furthermore, an unusual "nutcracker" picture emerges for lattice-motivated EOS, which is the formation of two *shells* which are physically separated *before* freeze-out.

10:45 - 12:30 hrs and 14:00-17:30 hrs -- Conference Room 40-S2-A01

2) Miniworkshop on "Particle densities in central Pb+Pb collisions at the LHC"

There will be six speakers on this subject. They will review, within different classes of models, the present status of predictions for the central (charged) multiplicity densities in zero impact parameter Pb+Pb collisions at the LHC, the effects of recent revisions of the nuclear structure functions based on HERA data on these predictions, and the impact of soon-to-be-expected multiplicity measurements in central Au+Au collisions at RHIC. An overview of event generators used to simulate heavy-ion collisions at the LHC will also be given.

1. Kari Eskola: Estimates from perturbative QCD for dN_{ch}/dy in central Pb-Pb collisions at the LHC
2. Nils Hammon: Hadron yields in a thermal model with initial conditions from pQCD
3. Xin-Nian Wang: Can one really predict dN_{ch}/dy for Pb+Pb collisions at LHC?
4. Carlos Pajares: String fusion model at LHC energies
5. Andreas Morsch: Event Generators for ALICE simulations
6. Marc Bedjidian: Simulations of heavy-ion collisions in CMS and detector response

Organisers: Yiota Foka and Ulrich Heinz

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

Friday 21 May

MEETING ON PARTICLE PHYSICS PHENOMENOLOGY

at 14.00 hrs - TH Conference Room

The decay $K \rightarrow \pi \bar{\nu} \nu$ in left-right symmetric extensions of the Standard Model

by U. NIERSTE / Fermilab

$K_L \rightarrow \pi^0 \bar{\nu} \nu$ is the decay mode with the cleanest hadronic environment in Kaon physics. It is currently searched for by the Fermilab KTeV collaboration. In the Standard Model this decay mode is CP-violating and suppressed. Yet in certain left-right symmetric models the decay can take place via a CP-conserving transition and may be used to constrain the right-handed sector. The importance of QCD corrections to the decay amplitude will be stressed in the talk.

Tuesday 25 May

CERN HEAVY ION FORUM

at 10.00 hrs - TH Conference Room, bldg 4/3-004

QCD in extreme conditions; chiral symmetry and the phase diagram

by Frank WILCZEK / Institute for Advanced Study, Princeton

Two lectures, two more will follow on Friday, 28 May.

I: QCD in Extreme Conditions: General Introduction

This will be a general overview of QCD in the limits of high virtuality, high temperature, and high density, where we have the clearest understanding of how to relate the phenomena to fundamental theory. Recently there have been dramatic developments in our understanding of the high-density behavior, bringing new perspectives on confinement and chiral symmetry breaking. I will especially emphasize these.

II: Chiral Symmetry and the Phase Diagram

I will first discuss how general renormalization group arguments allow us to make some rigorous yet highly non-trivial statements about the phase transition to chiral symmetry restoration. Then I will combine these results with some general arguments to make it plausible that there is a true critical point in QCD, and briefly discuss experimental signatures for it (following Stephanov, Rajagopal, and Shuryak). I will also discuss related out-of-equilibrium phenomena, especially the possibility of a disordered chiral condensate.

Organisers: Yiota Foka and Ulrich Heinz

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

Thursday 27 May

LARGE HADRON COLLIDER COMMITTEE

at 09.00 hrs - Auditorium, bldg 500

Open Session

- | | |
|-------------|---|
| 09.00-09.15 | Status of the LHC project (L. Maiani) |
| 09.15-10.00 | Status of the LHC machine (L. Evans) |
| 10.00-10.30 | COFFEE BREAK |
| 10.30-11.15 | ALICE proposal addendum: Transition Radiation Detector (P. Braun-Munzinger) |
| 11.15-12.00 | Report from the Standard Model Workshop (G. Altarelli) |

Thursday 27 May

TECHNICAL PRESENTATION

14.00 - 17.00 hrs – Bât. 40/R-D10

Low Level Instruments and PC-Measurement products

By: KEITHLEY INSTRUMENTS S.A./P.LINDQUIST & J. BÖTSCHI

Presentation of sensitive measurement products such as: Electrometers, Nanovoltmeters, Micro-ohm meters, Picometers, Precision Sources.

SMU's (Source-Measure Units) for component characterisation and many other utilisations. High voltage devices. A series of Digital Multimeters with built in scanners. Miniaturised modules for performing precision measurements over Ethernet or other type of standard-bus. High demand switching.

In addition they will also present some of their PC-measurement products - software and hardware, as well as the real-time applications control system ADWIN.

Language : English, French, German, Swedish

Information : S.Shearer SPL / 76360

Jeudi 27 mai

PRÉSENTATION TECHNIQUE

14h00 - 17h00 hrs – Bus d'exposition INFOLINER/
Parking Bât. 252

Connexions sans vis

par M. A. Zingg - WAGO CONTACT (CH)

Vous obtiendrez des informations sur les connexions sans vis telles que le connexion CAGE CLAMP éprouvée des milliards de fois, CAGE CLAMP COMPACT ainsi que sur la connexion par enfichage direct utilisée dans les boîtes de dérivation. La nouvelle connexion par perçage d'isolant FIT CLAMP intégrée dans les bornes sur rail vous sera également présentée.

Langues : allemand, français, anglais

Information : S.Shearer/SPL-PS/76360

Thursday 27 May

CERN COLLOQUIUM

at 16.30 hrs – Auditorium, bldg 500*

Getting its from BITS

by Frank WILCZEK / Institute for Advanced Study,
Princeton

A great program in natural philosophy, going back at least as far as Pythagoras, has been to derive the structure of the world from pure numbers. After a brief historical introduction, I will discuss where we stand with this program. I shall argue that in some parts of physics we have realized it to an amazing extent, but that major challenges remain.

Organiser : Luigi DI LELLA / EP Division

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

Friday 28 May

CERN HEAVY ION FORUM

at 10.00 hrs – TH Conference Room, bldg 4/3-004

QCD at finite baryon density

by Frank WILCZEK / Institute for Advanced Study,
Princeton

I: Methods and Color-Flavor Locking

Recently, by combining methods of many-body theory (Fermi liquid and BCS theory, Landau damping) to QCD with asymptotic freedom, we have been able to form a rigorous understanding of the asymptotically symmetry breaking in a fully calculable framework. For example, all the elementary excitations carry integral electric charge.

A key concept is that both color and flavor symmetry are separately broken, but a combination of the two remains valid: color-flavor locking.

II: Quark Description of Hadronic Phases

I will first argue that the calculable high-density phase (from part I) resembles in many significant details the phase one expects based on conventional wisdom and experimental and numerical experience at low density. This makes it plausible that there is no phase transition: quark-hadron continuity.

I will then discuss the interesting complications that come in when we take into account that the strange quark mass is not negligible in reality.

See announcement of HIF on 25 May 1999 with the first two lectures by F. Wilczek.

Organisers: Yiota Foka and Ulrich Heinz

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