

# 3 TASK

Wednesday, 26.03.2008, Room 2150 (2nd floor)

Time	ID	<p style="text-align: center;"><b>TASK 1: NEUTRINOS</b> <i>Chair: A. Badertscher, PSI</i></p>
08:30	301	<p style="text-align: center;"><b>Status of the OPERA neutrino-oscillation experiment</b></p> <p style="text-align: center;"><i>Thomas Strauss, Institute for Particle Physics, ETH Zürich, Schafmattstr. 20, 8093 Zürich (for the OPERA collaboration)</i></p> <p>The OPERA experiment (Oscillation Project with Emulsion tRacking Apparatus) is a long baseline neutrino-oscillation experiment searching for tau-neutrino appearance in the CNGS (CERN Neutrinos to Gran Sasso) muon-neutrino beam from CERN. The OPERA detector is installed in hall C of the Gran Sasso underground laboratory (LNGS, (Laboratori Nazionali del Gran Sasso) near Rome, Italy, at a distance of about 730 km from CERN. The detector consists of two identical super-modules. A super-module contains the neutrino target made of about 77'000 lead-emulsion bricks with a total mass of 675 tons and a magnetic muon spectrometer downstream of the target. Electronic detectors in the target section and the spectrometer measuring secondary particles are used to identify the brick where a neutrino interaction occurred. The tracks from charged particles around the interaction vertex can be reconstructed with submicron precision in the photographic emulsions, allowing the reconstruction of the event topology with very high resolution. Reconstructed tau-decays are used to identify tau-neutrinos. The first beam correlated neutrino events in the OPERA target were observed during a short run in the fall of 2007. The status of the detector and the CNGS beam will be summarized, and some results from the 2007 run will be presented.</p> <p>The OPERA detector can also be used to measure the neutrino induced charm production. First results from a Monte Carlo study of charmed particle detection with OPERA will also be shown.</p>
09:00	302	<p style="text-align: center;"><b>Muon tracking with the electronic detectors in the OPERA experiment</b></p> <p style="text-align: center;"><i>Claudia Lazzaro, Institute for Particle Physics, ETH Zürich, Schafmattstr. 20, 8093 Zürich (for the OPERA collaboration)</i></p> <p>The OPERA neutrino detector has two identical super-modules, each consisting of a lead-emulsion brick target and a magnetic muon spectrometer downstream of the target section.</p> <p>The electronic detectors consist of scintillator strips installed between the brick walls of the target (Target Trackers), and RPCs and drift tubes in the magnetic spectrometers. The main aim of the electronic detectors is to select the brick where the neutrino interaction took place (brick finding procedure). For the brick finding the muon track originating from a neutrino interaction is reconstructed with the data from the electronic detectors. In addition, the charge and the momentum of the muons are measured in the spectrometers. The muon momentum at the neutrino vertex is then estimated using a Kalman filter, taking into account energy loss and multiple scattering in the detector material. The</p>

		<p>initialization of the process is made with the momentum obtained at the end of the track from the spectrometer.</p> <p>Results of the brick finding procedure applied to real neutrino events will be presented, and the muon momentum resolution obtained from Monte Carlo generated CC neutrino events will be shown.</p>
09:15	303	<p style="text-align: center;"><b>Electron identification in the OPERA experiment</b></p> <p style="text-align: center;"><i>Frank Meisel, Institut de Physique, Université de Neuchâtel, A.-L.Breguet, 2000 Neuchâtel (for the OPERA collaboration)</i></p> <p>The goal of the OPERA experiment is to prove the appearance of tau neutrinos in a beam of muon neutrinos created at CERN. The oscillation of muon neutrinos to tau neutrinos can be measured with OPERA in a five year run period, given the current values of the neutrino mixing parameters. The signature for a tau neutrino is the observation of the decay of a tau lepton, which was produced in an OPERA lead-emulsion brick by a tau neutrino interaction. One of the main decay channels of the tau lepton is the decay into an electron. The electron can be identified by a detailed analysis of the shower which it produces in an OPERA brick. The very high granularity of the photographic emulsions allows the determination of the electron energy and the vertex of their origin with good resolution.</p> <p>An overview of the tools developed to find and measure the electrons in the OPERA bricks will be given. Results obtained with the new tools will be presented, using Monte Carlo generated events with added background taken from bricks exposed to the NuMI neutrino beam at Fermilab as well as scanned bricks taken from the latest OPERA physics run.</p>
09:30	304	<p style="text-align: center;"><b>Observation of a NC-like neutrino interaction in the OPERA detector at the scanning laboratory in Bern</b></p> <p style="text-align: center;"><i>Jonas Knüsel, Laboratory for High Energy Physics, Universität Bern, Sidlerstr. 5, 3012 Bern (for the OPERA collaboration)</i></p> <p>OPERA is a long baseline neutrino oscillation experiment aiming at the direct observation of tau neutrinos in an almost pure muon neutrino beam. The short lived tau particle, produced in the CC tau neutrino interactions in the OPERA lead target, will be detected using nuclear emulsions as tracking detector. The large amount of nuclear emulsions to be analyzed required the development of fast full-automated microscopes. The Bern emulsion laboratory was deeply involved in this development and is hosting five of these microscopes, able to cover about 10% of the whole scanning load of the experiment (&gt;2000 events).</p> <p>The OPERA data taking started in summer 2007 and 38 neutrino interactions were triggered by the OPERA electronic detectors in the first run. Also the first two OPERA neutral current events were observed. One of the two was scanned in the Bern scanning laboratory.</p>

09:45	305	<p style="text-align: center;"><b>The NA61 experiment at CERN SPS</b></p> <p style="text-align: center;"><i>Claudia Strabel, André Rubbia, Alberto Marchionni, Anselmo Mereaglia ETH Zürich, IPP, Schafmattstr. 20, 8093 Zürich</i></p> <p>NA61 is a large acceptance hadron spectrometer at the CERN SPS, which allows for a precise study of the particle production from the interaction of a 30 GeV/c proton beam on a Carbon target in order to predict the neutrino flux of the T2K long baseline experiment at JPARC, Japan.</p> <p>A detailed description of the trigger setup as well as of the strategy to determine the absolute normalization of the particle production cross section will be given. Furthermore, the importance of the absolute measurements of the neutrino flux for T2K will be discussed.</p>
10:00		<p><b>Coffee Break</b></p>
		<p><b>TASK 2: HERA, BELLE</b></p> <p><i>Chair: O. Schneider, EPFL</i></p>
10:30	<p>311</p> <p style="color: red;">(&amp;)</p> <p>363</p>	<p style="text-align: center;"><b>Prompt Photons in Photoproduction at H1</b></p> <p style="text-align: center;"><i>Krzysztof Nowak, Katharina Müller, Physik-Insitut der Universität Zürich, Winterthurerstrasse 190, 8057 Zürich</i></p> <p>A measurement of prompt photons in photoproduction at the H1 detector is presented. Production of isolated photons with high transverse momentum can be well-calculated in QED, but previous measurements have shown that higher order corrections are important. The analysis is based on data taken in the years 99-07 with a total integrated luminosity of <math>340 \text{ pb}^{-1}</math>. The experimental challenge is the separation of photons from background from neutral mesons which is dominating. The photon signal is extracted by combining different shower shape variables into a likelihood and fitting the background and photon fraction to the data. Inclusive and exclusive (photon+jet) cross sections will be presented as a function of the transverse energy (<math>6 &lt; E_T &lt; 15 \text{ GeV}</math>), the pseudorapidity (<math>-1 &lt; \eta &lt; 2.43</math>) and the momentum fractions <math>x_\gamma</math> and <math>x_{\text{proton}}</math> of the incident photon and proton carried by the constituents participating in the hard scattering process:</p> <p style="color: red; text-align: center;"><b>CANCELLED. Instead Poster 363 is additionally presented as talk.</b></p>
11:00	312	<p style="text-align: center;"><b>Charm in Charged Current at H1</b></p> <p style="text-align: center;"><i>Tobias Zimmermann Institut für Teilchenphysik der ETH Zürich, Schafmattstr. 20, 8093 Zürich</i></p> <p>In charged current interactions the production of Charm quarks proceeds primarily through <math>W^+ s \rightarrow c</math>. This process also leads to the possibility of measuring the Strangeness content of the proton, which is not yet well known. Due to its small cross section of about 4 pb this process has not been published for HERA up to now.</p> <p>In this talk a measurement of this process using the data taken in the years 2003 - 2007 (HERA II) by the H1 detector is presented. For this measurement both the lifetime of the charmed meson and the charge asymmetry in semileptonic decays are used.</p>

10:45	313  (&  362	<p style="text-align: center;"><b>Measurement of beauty production at HERA using di-electron events</b></p> <p style="text-align: center;"><i>Michel Sauter</i> <i>Institut für Teilchenphysik, ETHZ Zürich, Schafmattstrasse 20, 8093 Zürich</i></p> <p>A measurement of beauty production in ep interactions will be presented with a focus on beauty quarks that are produced in photoproduction (<math>Q^2 &lt; 1 \text{ GeV}</math>) and with a low transverse momentum of the b quark (low <math>p_{\perp}(b)</math>). In particular the process <math>ep \rightarrow bb^* \rightarrow (e) ee X</math> is analyzed. The data was measured with the H1 experiment at HERA with the help of dedicated electron trigger (<math>p_{\perp}(e) &gt; 1.2 \text{ GeV}</math>) based on the Fast Track Trigger. The experimental challenge of this analysis is the identification of the electrons at lowest transverse momenta. This is achieved by combining the energy loss measured in the tracking chambers (<math>dE/dx</math>) with information obtained from the calorimeter (measurement of the energy deposition and of the shower profile). In this context a new method to calibrate the calorimeter with a simultaneous determination of the dead material will be presented.</p> <p style="text-align: center;"><b>CANCELLED. Instead Poster 362 has been converted to talk.</b></p>
11:15	314	<p style="text-align: center;"><b>Observation of <math>B_s^0 \rightarrow \phi \gamma</math> and Search for <math>B_s^0 \rightarrow \gamma \gamma</math> Decays at Belle</b></p> <p style="text-align: center;"><i>Jean Wicht, LPHE, EPFL, 1015 Lausanne</i></p> <p>We search for the radiative penguin decays <math>B_s^0 \rightarrow \phi \gamma</math> and <math>B_s^0 \rightarrow \gamma \gamma</math> in a 23.6 fb<sup>-1</sup> data sample collected at the <math>\Upsilon(5S)</math> resonance with the Belle detector at the KEKB e<sup>+</sup>e<sup>-</sup> asymmetric-energy collider. We observe for the first time a radiative penguin decay of the <math>B_s^0</math> meson in the <math>B_s^0 \rightarrow \phi \gamma</math> mode. No significant <math>B_s^0 \rightarrow \gamma \gamma</math> signal is observed.</p>
11:30	315	<p style="text-align: center;"><b>Measurements of the polarization fraction and CP-violation parameters for the decay of <math>B^0 \rightarrow D^{*+}D^{*-}</math> at Belle.</b></p> <p style="text-align: center;"><i>Kim Vervink, Tagir Aushev, EPFL SB IPEP LPHE1, BSP 620, 1015 Lausanne</i></p> <p>We report measurements of the polarization fraction and CP-violation parameters for the decay of <math>B \rightarrow D^{*+}D^{*-}</math>. The results are based on a data sample of <math>657 \cdot 10^6</math> <math>BB^*</math> events, collected at the <math>\Upsilon(4S)</math> resonance with the Belle detector at the KEKB asymmetric-energy e<sup>+</sup>e<sup>-</sup> collider.</p>
11:45	316	<p style="text-align: center;"><b>Study of <math>B \rightarrow X(3872)(D^*D)K</math> at Belle</b></p> <p style="text-align: center;"><i>Nicolas Zwahlen, Tagir Aushev, Laboratoire de Physique des Hautes Energies, EPFL, Bâtiment des Sciences Physiques, 1015 Lausanne</i></p> <p>The X(3872) state was discovered at Belle in 2003 but its nature is still uncertain. We report a new search for <math>B \rightarrow X(3872)K</math> with X(3872) decaying to <math>D^{*0}D^{*0}</math> using a sample of <math>657 \cdot 10^6</math> <math>BB^*</math> pairs recorded at the <math>\Upsilon(4S)</math> resonance with the Belle detector at the KEKB asymmetric energy e<sup>+</sup>e<sup>-</sup> collider. The study is performed separately for the <math>D^{*0} \rightarrow D^0 \gamma</math> and <math>D^{*0} \rightarrow D^0 \pi^0</math> decay modes.</p>
12:00	<b>Postersession, Lunch</b>	
12:45	<b>SPS GENERAL ASSEMBLY</b>	

Time	ID	<p style="text-align: center;"><b>TASK 3: LOW ENERGY</b> <i>Chair: M. Pohl, Uni Genève</i></p>
13:15	321	<p style="text-align: center;"><b>Precision Experiments on Muon Capture and Muon lifetime.</b> <b>Latest results and future goals.</b></p> <p style="text-align: center;"><i>Bernhard Lauss, Paul Scherrer Institut, WMSA - B13, 5232 Villigen - PSI</i></p> <p>The high intensity muon beams at the Paul Scherrer Institut and newly developed techniques provide the basis for high precision experiments of weak interaction processes.</p> <p>I will present two new results:</p> <ul style="list-style-type: none"> <li>- the MuCAP experiment has yielded its first value for the pseudo-scalar coupling constant <math>g_p</math> and thus resolved the puzzle amongst previous experiments with mutually inconsistent results and theory;</li> <li>- the MuLAN experiment has recently published a 5 ppm precision value for the Fermi constant <math>G_F</math> and has recorded a few times <math>10^{12}</math> muon decay events, necessary for reaching its final 1 ppm precision goal.</li> </ul> <p>Based on these successes a new project will be launched, MuSun, the high precision determination of the muon capture rate on the deuteron, with the goal of a benchmark result for this basic electro-weak reaction in a two-nucleon system. The experiment will exploit the close connection between this semileptonic process, neutrino induced reactions and proton-proton fusion. Hence the muon capture rate is relevant for the determination of the neutrino production in our sun and of the solar neutrino detection rate in heavy water detectors like SNO. I will introduce the physics and experimental techniques of the MuSUN experiment.</p>
13:45	322	<p style="text-align: center;"><b>Muon lifetime measurement with the FAST Experiment:</b> <b>First results</b></p> <p style="text-align: center;"><i>Chiara Casella, Université de Genève, 24, quai E. Ansermet, 1205 Genève</i></p> <p>The aim of the FAST experiment at the Paul Scherrer Institute is to measure the Fermi coupling constant <math>G_F</math> to a precision of 1 ppm, representing an order of magnitude improvement over the current world average. This requires measurement of the positive muon lifetime <math>\tau_{\mu^+}</math> to a precision of 4 ps in a sample of <math>O(10^{12})</math> muon decays, collected at an event rate of about 100 kHz.</p> <p>The first physics results from FAST will be presented, based on a few <math>10^{10}</math> events collected in the 2006 run, providing a new measurement of <math>G_F</math> that is competitive with the current world average.</p>

14:00	323	<p style="text-align: center;"><b>Ultracold neutrons at Paul Scherrer Institut - study of the physics of ultracold neutron production in deuterium</b></p> <p style="text-align: center;"><i>Malgorzata Kasprzak for the UCN collaboration, Paul Scherrer Institut, 5232 Villigen PSI</i></p> <p>Ultracold neutrons (UCN) are neutrons with the energy of about 100 neV, that can be stored in bottles with lifetimes comparable to the free neutron lifetime ( ~ 15 min). The UCN source currently being built at PSI is based on solid deuterium as the material for the generation of ultracold neutrons. Over the past few years the experimental investigations concerning UCN production in D<sub>2</sub> were carried on, leading to the understanding of the underlying physics. The status of the research will be presented and discussed.</p>
14:15	324	<p style="text-align: center;"><b>Towards an Improved Neutron Electric Dipole Moment Experiment</b></p> <p style="text-align: center;"><i>Marcin Kuzniak, Paul Scherrer Institut, WMFA/B12, 5232 Villigen PSI, on behalf of the nEDM collaboration (LPC Caen, JINR Dubna, Uni Fribourg, PNPI Gatchina, ILL Grenoble, LPSC Grenoble, UJ Krakow, KUL Leuven, Uni Mainz, TUM München, PSI Villigen)</i></p> <p>A new measurement of the nEDM, using the Ramsey method of separated oscillating fields, is being designed at the spallation source of ultra-cold neutrons (UCN) at Paul Scherrer Institut (PSI). Already the current upper limit for nEDM (<math>&lt;2.9e-26</math> e.cm) constrains some extensions of the Standard Model. The new experiment aims at two orders of magnitude reduction of the upper limit, to be achieved with better control of systematic effects and the higher UCN flux provided by the new PSI source. The first phase of the experiment will use an improved version of the Sussex group's apparatus (which has produced the current world's best result) moved from Institut Laue-Langevin to PSI. Status of R&amp;D and results of recent tests, concerning, in particular, the new deuterated polystyrene coated storage chamber for UCNs, will be reported.</p>
14:30	325	<p style="text-align: center;"><b>A Direct Experimental Limit on Neutron - Mirror Neutron Oscillations</b></p> <p style="text-align: center;"><i>Andreas Knecht, Paul Scherrer Institut, WMFA/C11, 5232 Villigen PSI (on behalf of the nEDM collaboration)</i></p> <p>The hypothesis of a parallel 'mirror' world containing a copy of our ordinary particle spectrum has some motivation in astrophysics. Apart from gravitational interactions, subtle effects can lead to transitions from one world to the other. Not only is mirror matter a natural candidate for dark matter, fast neutron - mirror neutron (nn') oscillations were also proposed as an explanation for ultra high energy cosmic protons beyond the Greisen-Zatespin-Kuzmin cutoff. Recently, it has been pointed out that ultracold neutron storage experiments would be very applicable for improving the present indirect constraints on the probability of nn' oscillations. We report on an experimental comparison of ultracold neutron storage in a trap with and without superimposed magnetic field, providing an experimental limit on the oscillation time. Details and results of the first such measurement will be presented and the consequences discussed.</p>

14:45	326	<p style="text-align: center;"><b>Large Electron Multiplier (LEM) Based Charge Readout System for the ArDM Experiment.</b></p> <p style="text-align: center;"><i>Polina Otyugova, Marco Laffranchi, Alberto Marchionni, André Rubbia</i> <i>Institute for Particle Physics, ETH Zürich, Schafmattstrasse 20, 8093 Zürich</i></p> <p>The goal of the ArDM project is to construct and operate a 1 ton underground detector to search for evidence for the existence of Weakly Interacting Massive Particle (WIMP) dark matter in the Universe. The designed detector is supposed to be sensitive to the small signals of scintillation light and ionization charge independently.</p> <p>The project heavily relies on the possibility to extract the electrons produced by the ionization due to the nuclear recoil from the liquid phase of the detector into the gas phase and to amplify them for achieving a sufficient signal. Status of the Large Electron Multiplier (LEM) based charge readout system R&amp;D and results are described in the present talk.</p>
15:00	327	<p style="text-align: center;"><b>Assembly and test of the light readout for the ArDM WIMP-detector</b></p> <p style="text-align: center;"><i>Vittorio Boccone, Claude AMSLER, Christian Regenfus, Sosuke Horikawa, Jacky Rochet, Physik-Institut der Universität Zürich, Winterthurerstr. 190, 8057 Zürich (on behalf of the ARDM Collaboration)</i></p> <p>For ArDM, a next-generation 1 ton WIMP detector, we developed the light readout system. Argon VUV scintillation light has to be converted with wavelength shifters such as TetraPhenyl Butadiene (TPB) or p-terphenyl (TPH) in order to be detected by photomultipliers with bi-alkali photocathodes.</p> <p>We optimized the evaporation process of TPB on Tetratex(R) membranes (ePTFE) and we built 15 large wavelength shifter panels to cover the internal surface of the active volume of ArDM. Light will then be detected with 14 cryogenic photomultipliers immersed in liquid argon. The support structure of the photomultiplier modules has been installed and 8 modules with different characteristics have been tested in the ArDM 1 ton dewar. First results for the light readout efficiency will be presented.</p>
15:15	328	<p style="text-align: center;"><b>Study on Positronium formation</b></p> <p style="text-align: center;"><i>Ulisse Gendotti, Andre Rubbia, Paolo Crivelli</i> <i>ETHZ &amp; CERN, Mailbox: A24200, 1211 Genève</i></p> <p style="text-align: center;"><i>(In collaboration with: CEA Saclay DAPNIA, France; École Polytechnique, France; Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan; CERI-CNRS (Centre d'Études et de Recherches par Irradiation), Orléans, France; Groupe de Chimie du Solide, Laboratoire de Physique de la Matière Condensée, Ecole Polytechnique, France; CNRS Laboratoire de Chimie Physique et Microbiologie pour l'Environnement, Nancy, France; Valentin Valtchev CNRS Laboratoire de Matériaux à Porosité Contrôlée, Mulhouse, France)</i></p> <p>Positronium is the bound state of positron and electron and exist in two ground states: -para-positronium (pPS) the singlet spin state with a lifetime of 125 ps. -ortho-positronium (oPS) the triplet state with a lifetime of 142ns. We produce oPs in thin porous films using using a slow positron beam. Positron are implanted with an energy of 1-6 keV in the thin film and form positronium in the</p>

		<p>material bulk. A fraction of formed oPs can diffuse into the pores and then due to the pores interconnectivity be reemitted in the vacuum. The goal of our measurement is to demonstrate that a fraction of the o-Ps produced in the target is re-emitted in vacuum and to study the dependency of the velocity distribution with the temperature. Two different measurements have to be combined: 1) A time of Flight detector to measure the reemission velocity distribution of the o-Ps. 2) A PALS (Positron Annihilation Lifetime Spectrometer) detector to measure the positron to o-Ps conversion fraction. Several porous samples growth with different types of porogens were tested. Positronium yield of about 40 % and energy reemission of 100 meV was found in samples growth with CTACl (cetyl-trimethyl-ammonium chloride) as structuring agent.</p>
<b>15:30</b>		<b>Coffee Break</b>
		<b>TASK 4: ASTROPHYSICS</b> <i>Chair: G. Dissertori, ETHZ</i>
<b>16:00</b>	<b>331</b>	<p><b>Very High Energy Cosmic Gamma-Rays: Status and Future Plans</b></p> <p style="text-align: center;"><i>Adrian Biland</i>  <i>Institute for Particle Physics, ETH Zürich, Schafmattstr. 20, 8093 Zürich</i></p> <p>Since the latest Cherenkov Observatories H.E.S.S. and MAGIC started regular data-taking few years ago, our knowledge about the non-thermal universe at energies above ~100 GeV has significantly changed. More than 50 galactic and extra-galactic sources belonging to different astrophysical object-classes have been identified, while several other sources seem to have no known counterpart.</p> <p>Additionally, the measurement of VHE photons from transient sources at astronomical distances allows to test e.g. Quantum Gravity theories in domains not accessible by other experiments.</p> <p>At the moment, H.E.S.S. and MAGIC are upgrading their experiments to increase sensitivity and lower the energy threshold, but the unexpected richness of the VHE sky mandates for an even better observatory. Therefore, a pan-european 'Cherenkov Telescope Array (CTA)' initiative has been started, with several swiss groups as active participants.</p> <p>In this talk, I will give a introduction to the observation technique and a brief overview over recent discoveries. Additionally I will present the status of CTA, with special emphasize on swiss contributions.</p>
<b>16:30</b>	<b>332</b>	<p style="text-align: center;"><b>Observation of Active galactic nuclei in gamma-rays with the MAGIC telescope</b></p> <p style="text-align: center;"><i>Daniel Kranich, ETH Zürich, Schafmattstrasse 20, 8093 Zürich</i></p> <p>The Major Atmospheric Gamma-ray Imaging Cherenkov telescope is located on the Canary island La Palma at 2200m above sea level. The main objective is the investigation of Gamma-ray sources in the energy range from ~50 GeV up to several TeV. Among the sources of high energy gamma-rays are the so-called Active Galactic Nuclei, one of the most luminous objects in the known universe. AGN are powered by supermassive black holes and are visible throughout the electromagnetic spectrum. They occasionally also show highly variable emission in X- and gamma-rays. Here we present an overview of some recent results</p>

		obtained with the MAGIC telescope, most notably the detection of the famous objects 3c 279 and BL Lac.
16:45	333	<p style="text-align: center;"><b>Observation of very high energy gamma-rays from Galactic sources with the MAGIC telescope</b></p> <p style="text-align: center;"><i>Sebastian Commichau, Institute for Particle Physics, ETH Honggerberg, Schafmattstrasse 20, HPK E24, 8093 Zurich</i></p> <p>The Major Atmospheric Gamma-ray Imaging Cherenkov (MAGIC) telescope, which is currently the largest single dish Imaging Air Cherenkov Telescope (IACT), is under regular operation since the end of 2003. In the meantime numerous Galactic sources such as supernova remnants, pulsar wind nebulae, pulsars, binary systems, microquasars and globular cluster have been observed at Very High Energy (VHE) gamma-rays. The MAGIC observations provide a deep insight into the energetic processes taking place in these sources. A detailed status report on the MAGIC view of the Galaxy will be given.</p>
17:00	334	<p style="text-align: center;"><b>Five years of INTEGRAL science</b></p> <p style="text-align: center;"><i>Stephane Paltani, ISDC, Geneva Observatory, ch. d'Ecogia 16, 1290 Versoix (on behalf of the ISDC scientists)</i></p> <p>The INTEGRAL satellite is a mission of the European Space Agency with the capability to observe the sky in the X-ray and soft gamma-ray domain, providing unsurpassed imaging and spectral capabilities in this very difficult domain. Scientific operations are performed by the ISDC consortium in Versoix, which is funded in large part by Switzerland and Geneva University. INTEGRAL has been in activity for five years already and has produced a number of very important scientific results. Among them, INTEGRAL has explored the spatial extension of the 511 keV annihilation line and of the Al26 radioactivity line in our Galaxy. Thanks to its unique survey capabilities, it has discovered very highly absorbed galactic sources and active galactic nuclei. It is able to catch transient phenomena, like gamma-ray bursts and super-fast X-ray transients. INTEGRAL has also uncovered the largest particle accelerator in a nearby cluster of galaxies.</p>
17:15	335	<p style="text-align: center;"><b>The Universe: a powerful particle accelerator</b></p> <p style="text-align: center;"><i>Roland Walter, INTEGRAL Science Data Centre/Geneve Observatory, Chemin d'Ecogia 16, 1290 Versoix</i></p> <p>In the last years, high energy particle acceleration has been established in Supernova remnants; collision of massive stellar winds; close to deep gravitational potentials; in gamma-ray bursts, etc. These new discoveries have largely been made possible by instruments opening new high energy spectral windows in the electromagnetic spectrum. Some of these results will be highlighted as well as current (INTEGRAL) and future (CTA, XEUS) projects with strong swiss participation.</p>

17:30	336	<p style="text-align: center;"><b>IceCube, a neutrino telescope in the Antarctic ice: First results.</b></p> <p style="text-align: center;"><i>Céline Terranova, EPFL SB IPEP LPHE1, BSP 611, 1015 Lausanne</i></p> <p>The IceCube Neutrino Observatory in Antarctica is a kilometer-scale detector operating deep within the ice at the geographic South Pole. When completed, it will be composed of 4800 optical modules deployed between 1.4 km and 2.4 km below the surface, where the Cerenkov radiation of charged particles created in neutrino interactions can be observed through clear ice.</p> <p>The detection of neutrinos supposedly produced by interactions of cosmic ray particles with the surrounding radiation environment in cosmic accelerators would provide an explanation about the origin of the cosmic rays and the power law spectrum they follow. Compared to cosmic rays that are deflected and photons that are absorbed, neutrinos travel from their source without disturbances. Their observation would therefore provide a complementary look to the sky.</p> <p>IceCube program includes researches about fundamental particle physics and astrophysics. In this talk I will report on the status and results of the experiment.</p>
17:45	337	<p style="text-align: center;"><b>Ultra high energy neutrinos in IceCube and future detection methods.</b></p> <p style="text-align: center;"><i>Shirit Cohen, EPFL-SB-IPEP-LPHE, BSP/611-Cub, 1015 Lausanne</i></p> <p>The source of ultra high energy cosmic rays (UHECR) and their acceleration mechanisms have not been identified so far. The detection of a secondary ultra high energy (UHE) neutrino flux could help to solve the mystery. We expect a flux of cosmogenic neutrinos at these energies resulting from interactions of UHECR with the cosmic microwave background during propagation. Further flux contributions could originate directly from cosmological sources, possibly the same as the UHECR sources.</p> <p>The completed IceCube neutrino observatory will be able to detect these UHE neutrinos though with a limited sensitivity due to its instrumented volume of 1km<sup>3</sup> and the low flux of the events. An increased potential could be achieved with the detection of radio and acoustic signatures of UHE neutrinos, as the attenuation lengths in ice are larger in these channels than for the optical one. This allows for a much larger and sparsely instrumented detection volume.</p> <p>In this talk I will discuss UHE neutrinos in IceCube and the future detection techniques.</p>
18:00	338	<p style="text-align: center;"><b>Data analysis pipeline for the spherical gravitational wave detector MiniGRAIL</b></p> <p style="text-align: center;"><i>Carlos Filipe Da Silva Costa</i> <i>DPNC, Université de Genève, 24, Quai Ernest-Ansermet, 1211 Genève</i></p> <p>MiniGRAIL (GRAvitational Antenna In Leiden) is a spherical resonant mass of 68cm diameter made of CuAl. First measurements have been obtained with three transducers (DROS) at thermodynamic temperature of 5K. In the future, the detector will operate at 50mK with six transducers allowing a reconstruction of the gravitational wave direction. The GW sensitive spheroidal quadrupole modes have a frequency around 2980Hz.</p> <p>We are currently preparing the data analysis pipeline. We exploit the multi-mode capabilities of the sphere applying our knowledge of single-channel resonant detectors data analysis. First, we convert the current signal from the six</p>

		transducers output into six quadrupolar modes $h_m$ (including the scalar one). Then the modes are processed by means of the wavelet analysis and filtered via matched filtering. From the list of events generated for each mode, we look for coincidences and produce a list of candidate events. For each candidate event, we estimate the arrival direction and check if the event has the transverse geometry of a gravitational wave.
18:15		<b>END / Conference Dinner</b>

**Thursday, 27.03.2008, Room 2150 (2nd floor)**

Time	ID	PLENARY SESSION AND SPS AWARD CEREMONY
08:30		<i>Plenary Session</i>
10:00		<i>Coffee Break</i>
10:30		<i>Plenary Session continued</i>
11:15		<b>SPS AWARD CEREMONY</b>
11:45		<i>Plenary Session continued</i>
12:30		<i>Postersession, Lunchbuffet</i>
		<b>TASK 5: LHC I</b> <i>Chair: C. Grab, ETHZ</i>
14:00	341	<p><b>The Trigger and Data Acquisition for the ATLAS Experiment at CERN</b></p> <p><i>Andreas Battaglia, Hans-Peter Beck, Michele Weber</i> <i>LHEP, Uni Bern, Sidlerstr. 5, 3012 Bern</i></p> <p>The ATLAS experiment is getting ready to observe collisions between protons at a centre of mass energy of 14 TeV. These will be the highest energy collisions in a controlled environment to-date, to be provided by the Large Hadron Collider at CERN by mid 2008.</p> <p>The ATLAS Trigger and Data Acquisition (TDAQ) system is based on three levels of online event selection. Each trigger level refines the decisions made at the previous level and, where necessary, applies additional selection criteria. Starting from an initial bunch-crossing rate of 40 MHz, corresponding to an interaction rate of 1GHz at a luminosity of <math>1034 \text{ cm}^{-2} \text{ s}^{-1}</math>, the rate of selected events must be reduced to O(200) Hz for permanent storage. This requires an overall rejection factor on the trigger level of 105 against minimum bias events, while retaining the relatively rare interesting physics processes, such as W and Higgs boson decays.</p> <p>I will describe the general design and requirements of the TDAQ architecture, and I will focus on to the data-logging system, the so-called "Sub-Farm Output" (SFO) system. This is responsible for writing the events into raw data files according to stream and Luminosity Block information, and for sending the data files to the CERN Advanced STORAge system (CASTOR) for permanent storage.</p>

14:15	342	<p style="text-align: center;"><b>Preparation for the first LHC data on the Swiss ATLAS Grid</b></p> <p style="text-align: center;"><i>Szymon Gadomski, DPNC, Université de Genève, 24, Quai Ernest-Ansermet, 1211 Genève</i></p> <p style="text-align: center;"><i>Sigve Haug, LHEP, Universität Bern, Sidlerstr. 5, 3012 Bern</i></p> <p>The ATLAS experiment at the Large Hadron Collider will start taking data at the CERN laboratory in Genève in 2008. The experiment will collect around 3 PetaBytes (3 Million GigaBytes) of data per year. The analysis of this data will only be possible if we combine the computing power of many data processing centers around the World. The LHC experiment are aiming to achieve this with Grid computing.</p> <p>The two Swiss ATLAS groups, at Universities of Berne and Genève, are preparing their Grid computing resources in collaboration with the CSCS computing Center in Manno (TI). The work done in Switzerland will be presented in the context of the global Grid effort done for ATLAS.</p>
14:30	343	<p style="text-align: center;"><b>Electronic Calibration of the ATLAS Liquid Argon Calorimeters</b></p> <p style="text-align: center;"><i>Ahmed Ali Abdelalim, Alain Blondel, Arno Strässner</i></p> <p style="text-align: center;"><i>DPNC Université de Genève, 24, Quai Ernest-Ansermet, 1205 Genève</i></p> <p>The Liquid Argon Calorimeters play a central role in the ATLAS detector at the LHC. They measure electrons and photons with high resolution and detect hadronic jets and missing energy signatures.</p> <p>We study the electronic calibration of the electromagnetic barrel calorimeter, which is a lead-liquid argon sampling calorimeter. By injecting and measuring known current pulses on the detector cells, the pulse of a physics signal can be predicted and calibrated. The effect of capacitive cross-talk between detector cells on the pulse prediction is analysed and the impact on the energy resolution of the calorimeter is presented.</p>
14:45	344	<p style="text-align: center;"><b>Measurement of Spin and Parity of the Higgs Boson with ATLAS</b></p> <p style="text-align: center;"><i>Arno Strässner</i></p> <p style="text-align: center;"><i>DPNC Université de Genève, 24, Quai Ernest-Ansermet, 1205 Genève</i></p> <p>The search for the Standard Model Higgs boson is one of the primary physics goals of the ATLAS experiment at the LHC. When the Higgs boson will be discovered it is of great interest to investigate its fundamental properties. The Higgs boson will be the first elementary particle with spin 0. It is therefore important to verify its spin and parity in a measurement. A determination of these properties in the Higgs decay channel to two Z bosons with a subsequent decay into four leptons is studied. Kinematic properties of the final state leptons are sensitive to the helicity structure of the HZZ vertex. Expectations for measuring anomalous contributions to the Higgs decay vertex are presented.</p>

15:00	345	<p style="text-align: center;"><b>Discovering SUSY with ATLAS</b></p> <p style="text-align: center;"><i>Nicola Venturi, Hans-Peter Beck, Michele Weber</i>  <i>LHEP, Uni Bern, Sidlerstr. 5, 3012 Bern</i></p> <p>The ATLAS experiment is going to start taking data soon. One of the prime objectives is the search for Supersymmetry (SUSY) which represents a very promising extension of the standard model. An overview will be given of the official benchmark points in the parameter space of the minimal supersymmetric model. The performance of selected analyses will be presented, that show the early discovery potential of some of these benchmark points with ATLAS.</p>
15:15	346	<p style="text-align: center;"><b>Inclusive Supersymmetry Searches in the ATLAS experiment</b></p> <p style="text-align: center;"><i>Moritz Backes, Département de Physique Nucléaire et Corpusculaire,</i>  <i>24, Quai Ernest-Ansermet, 1211 Genève</i></p> <p>The ATLAS experiment is scheduled to collect first data in mid 2008. One of its main design goals is the search for new physics beyond the standard model. Supersymmetry (SUSY) is one of the most attractive possible extensions to the standard model answering many open questions in the field of particle physics. If SUSY really exists at the electroweak energy scale it is likely to be found at the LHC.</p> <p>Depending on the model framework and parameter realisation, a discovery with early ATLAS data is possible using inclusive analyses. Characteristic SUSY events typically have many high-pT final state leptons and hadronic jets plus significant missing transverse energy. In this talk an inclusive study within the one lepton channel will be presented. The particular SUSY model assumed for the analysis is mSUGRA.</p>
15:30		<p><b><i>Coffee Break</i></b></p>
		<p><b>TASK 6: LHC II</b></p> <p><i>Chair: H.-P. Beck, Uni Bern</i></p>
16:00	351	<p style="text-align: center;"><b>NNLO QCD predictions for the <math>H \rightarrow WW \rightarrow l \nu l \nu</math> signal at the LHC</b></p> <p style="text-align: center;"><i>Fabian Stöckli</i>  <i>Institute for Particle Physics, ETH Zürich, Schafmattstrasse 20, 8093 Zürich</i></p> <p>We present a first computation of the next-to-next-to-leading order (NNLO) QCD cross section for the production of four leptons from a Higgs boson of 165 GeV decaying into two W bosons at the LHC. We apply all nominal experimental cuts on the final state leptons and the additional hadronic activity and study the effect of higher order corrections up to NNLO on all kinematic variables that are constrained by the experimental cuts.</p>

16:15	352	<p style="text-align: center;"><b>Event Shapes at the LHC</b></p> <p style="text-align: center;"><i>Matthias Weber, ETH Institute for Particle Physics, HPK, ETH Hönggerberg, Schafmattstrasse 20, 8093 Zürich</i></p> <p>While event shape variables were widely used at e<sup>+</sup>e<sup>-</sup> colliders they have received far less attention at hadron colliders so far. In this talk the distributions of hadronic event shape variables in QCD events at the Large Hadron Collider are presented. It is shown that the normalized event shape distributions are robust under variations of the jet energy scale and jet energy resolution, which makes them suitable for initial data analysis. The influence of varying the jet clustering algorithm and the Monte Carlo generator on the event shape variables is studied.</p>
16:30	353	<p style="text-align: center;"><b>Study of the discovery potential of supersymmetry with final states with missing transverse energy, multiple jets and b-jets at the CMS detector.</b></p> <p style="text-align: center;"><i>Tanja Rommerskirchen</i> <i>University of Zürich, Institute of Physics, Winterthurerstr. 190, 8057 Zürich</i></p> <p>Supersymmetry is one of the most popular candidates for an extension of the standard model. Due to the large multiplicity of possible final states in supersymmetric decays, a search for supersymmetry should be as inclusive as possible. At the same time it is also important to put constraints on the several free parameters of supersymmetry.</p> <p>The search for hadronic final states with missing transverse energy and multiple b-jets covers a large part of the possible parameter space. This space can be constrained by determining the number of b-jet pairs and studying their mass-distribution. Depending on the point in parameter-space at which supersymmetry is realized in nature, the h<sup>0</sup> peak of the decay h<sup>0</sup> → bb<sup>-</sup> should become visible in the bb<sup>-</sup> mass distribution.</p> <p>A feasibility study using the full CMS detector simulation will be presented.</p>
16:45	354	<p style="text-align: center;"><b>Crystals for HEP calorimetry in extreme environments</b></p> <p style="text-align: center;"><i>Francesca Nessi-Tedaldi, ETH-Zürich, CERN - PH Department, 1211 Genève 23</i></p> <p>Scintillating crystals are used for calorimetry in several high-energy physics experiments. For some of them, performance has to be ensured in very difficult operating conditions, like a high radiation environment, very large particle fluxes, high collision rates, placing constraints on response and readout time. An overview is presented of the knowledge reached up to date, and of the newest achievements in the field, with particular attention given to the performance of Lead Tungstate crystals exposed to large particle fluxes.</p>

17:15	355	<p style="text-align: center;"><b>Integration and tests of the CMS Electromagnetic Calorimeter electronics</b></p> <p style="text-align: center;"><i>Wieland Hintz, Werner Luster Institute for Particle Physics, ETH Zürich, Schafmattstrasse 20, 8093 Zürich</i></p> <p>The measurement of the energy of electrons and photons with very high accuracy is of primary importance for the study of many physics processes at the Large Hadron Collider (LHC), in particular to search for the Higgs Boson. The electromagnetic calorimeter (ECAL) of the CMS experiment is made of ~76000 lead tungstate crystals and photo-detectors. Nearly 25000 printed circuit boards and about 5500 gigabit optical links are used to acquire the signals and transfer the data to the off-detector electronics. The integration of this electronics is presented. The testing strategy during the installation is described and the results of the achieved system performance are presented in detail.</p>
17:30	356	<p style="text-align: center;"><b>Implementation and commissioning of the Detector Control System for the electromagnetic calorimeter of the CMS experiment</b></p> <p style="text-align: center;"><i>Predrag Milenovic Institute for Particle Physics, ETH Zürich, Schafmattstrasse 20, 8093 Zürich</i></p> <p>In this presentation we describe the main design objectives and present the detailed specifications of the implemented Detector Control System (DCS) of the electromagnetic calorimeter (ECAL) of the CMS experiment. We also discuss the commissioning of each of its sub-systems. The emphasis is put on the performance of these subsystems during the commissioning of the ECAL detector at the CMS construction site in the year 2007.</p>
17:45	357	<p style="text-align: center;"><b>Testbeam study of the irradiated pixel barrel sensors for the CMS experiment</b></p> <p style="text-align: center;"><i>Enver Alagöz University of Zürich, CERN Bldg. 15-R-035 Mailbox: E04910, 1211 Genève</i></p> <p>The CMS experiment, currently under construction at the Large Hadron Collider (LHC) will include a silicon pixel detector to allow tracking in the region closest to the interaction point. At full LHC luminosity the pixel sensors will be exposed to a fluence of <math>3 \times 10^{14} n_{eq}/cm^2/yr</math>. A testbeam was performed at the end of September 2006 in order to study pixel position resolution. For the first time irradiated and unirradiated CMS pixels with the final dimensions (<math>100 \times 150 \mu m^2</math>) and readout chips were tested in the 3T field at the CERN testbeam facility. I will discuss new measurements of the charge collection efficiency and the position resolution from different hit reconstruction algorithms.</p>
18:00		<b>END</b>

ID	TASK POSTER
361	<p style="text-align: center;"><b>Search for the Higgs boson in the WW decay channel with the CMS experiment</b></p> <p><i>Thomas Punz, Institute for Particle Physics, ETH Zürich, Schafmattstrasse 20, 8093 Zürich</i></p> <p>The start of the CERN LHC pp collider is foreseen for 2008. A prospective analysis for the search of the Standard Model Higgs boson with the CMS experiment is presented. The analysis strategy for inclusive production of the Higgs boson decaying into a W pair is discussed in the context of the startup luminosity of <math>10^{32} \text{cm}^{-2} \text{s}^{-1}</math> at the LHC. This process is expected to be the main discovery channel if the Higgs mass lies around twice the W boson mass, where the Higgs branching ratio into two W bosons is almost one. Signal and background data sets obtained with a detailed Monte Carlo simulation of the detector response are treated using a complete reconstruction chain. The data corresponding to an integrated luminosity of <math>100 \text{pb}^{-1}</math> is analyzed.</p>
362	<p style="text-align: center;"><b>Current and Future Improvements of Imaging Air Cherenkov Telescopes</b></p> <p><i>Michael Rissi, Institute for Particle Physics, ETH Zürich, Schafmattstr. 20, 8093 Zürich</i></p> <p>Current Imaging Air Cherenkov Telescopes (IACT) like MAGIC, VERITAS or HESS observe very successfully galactic and extra-galactic Very High Energy Gamma Rays. Still, they are limited by two factors: Sensitivity and energy threshold. Means to improve these limitations will be presented. One is the replacement of photomultiplier tubes by high quantum efficiency Geiger mode APDs. This will improve the sensitivity as well as lower the threshold. Furthermore the implementation of an analog summation trigger may allow to lower the threshold by about a factor of 2.</p> <p style="text-align: center;"><b>(&amp;) Has been converted to talk (presented on Wednesday)</b></p>
363	<p style="text-align: center;"><b>POLAR: towards the origin of gamma-ray bursts</b></p> <p><i>Estela Suarez-Garcia, DPNC &amp; ISDC, Université de Genève &amp; Paul Scherrer Institut, 24, Quai Ernest-Ansermet, 1211 Genève</i></p> <p>The nature of gamma ray bursts (GRB), the brightest events in the universe, is still a mystery almost forty years after their discovery. One of the crucial and not-yet-determined parameters is their level of linear polarization. This quantity, intimately related with their emission mechanism, can provide very valuable information on the origin of GRBs. Therefore we are building the novel hard X-ray polarimeter POLAR. It will measure polarization of photons with energy 50-500keV and consists of an array of <math>40 \times 40</math> low-Z plastic scintillators (<math>6 \times 6 \times 200 \text{mm}^3</math> each). With its large modulation factor, effective area, and field of view, POLAR will observe a minimum detectable polarization less than 10% for several GRBs yearly. A POLAR engineering-qualification model will be ready in 2010. For the accommodation of the flight model, the Chinese Space Lab and the International Space Station are possible candidates. We will present the concept of POLAR, status, and latest results.</p>