Tipp 2014 - Third International Conference on Technology and Instrumentation in Particle Physics

Monday, June 2, 2014 - Friday, June 6, 2014

Beurs van Berlage

Scientific Program

The main tracks are: 1) Sensors, 2) Experiments, 3) Data processing, 4) Emerging technologies, 5) Impact on other sciences and technology transfer.

Sensors: 1a) Calorimetry

Detectors based on absorption of electromagnetic or hadronic showers in dense media. Examples include sampling calorimeters, crystal calorimeters, particle flow based devices and dual readout calorimeters.

Conveners: Jose Repond and Elena Rocco

Sensors: 1b) Semiconductor Detectors

Detector technologies based on charge collection in semiconducting devices. Examples include silicon strip and pixel detectors, SiC-based detectors, and diamond-based detectors.

Conveners: Vincenzo Chiochia and Jaap Velthuis

Sensors: 1c) Gaseous Detectors

Detector technologies based on signal generation in gaseous media. Examples include proportional and ionization chambers, micropattern gas detectors, and time projection chambers.

Conveners: Jochen Kaminski and Max Chefdeville

Sensors: 1d) Photon Detectors

This category includes photon detectors, exclusive of electromagnetic calorimeters. Examples include phototubes, silicon photomultipliers, photocathode developments and x-ray detectors.

Conveners: Gabriella Carini and Chiara Casella

Sensors: 1e) Novel technologies

Here all new developments that don't fit in the other sensor conference tracks can be entered.

Conveners: Cinzia da Via and Shuxia Tao

Experiments: 2a) Experiments & Upgrades

Multi-component detector systems and upgrades to existing detectors. This subject includes special overview talks from the major experiments/projects across the fields (collider experiments, rare kaon/muon experiments, neutrino experiments, dark matter experiments, astrophysics experiments, large scale R&D projects .... etc). This conference and this track is not for polished talks about all that is beautiful and works well. We'd like to hear what the limitations are of the current experiments and how it limits the science and focus on ideas on how to break these barriers. The overview talks could reference/advertise the shorter (more focused) talks from the same experiment.

Conveners: Massimiliano Ferro-Luzzi and Maria Chamizo

Experiments: 2b) Astrophysics and Space Instrumentation

Instrumentation intended for ground, upper atmosphere and space based studies. Examples include gamma ray satellites, cosmic microwave background (CMB) studies, instrumentation for x-ray astronomy, and technology for ground-based telescopes.

Conveners: Jan-Willem den Herder and Arne Rau

Experiments: 2c) Detectors for neutrino physics

Detectors for neutrino and rare decay physics. Examples include large water Cerenkov and liquid Argon neutrino detector arrays. This subject also includes instrumentation for studies of double beta decay, neutrino mass and proton decay.

Conveners: Glen Horton-Smith and Bruce Baller

Experiments: 2d) Dark Matter Detectors

Technology used in searches for dark matter. Examples include noble liquid detectors, bubble chambers and semiconductor-based detectors.

Conveners: Laura Baudis and Wolfgang Rau

Data-processing: 3a) Front-end Electronics

Electronics for amplification and signal conditioning for raw detector signals. Examples include transistor technologies, front-end circuits, 3D vertically integrated circuits, and circuits for extreme environments.

Conveners: Xavi Llopart Cudie and Marek Idzik

Data-processing: 3b) Trigger and Data Acquisition Systems

Electronics and software for event triggering and data acquisition. Examples include level 1 and 2 trigger systems for collider experiments, data acquisition systems based on xTCA, tracking trigger systems, and higher level trigger processor farms.

Conveners: Katsuo Tokushuku and Brian Petersen

Data-processing: 3c) Embedded software

Challenges of embedded software developments for instrumenting subdetectors in particle physics experiments, based on the usage of FPGAs and microprocessors. These include applications in data-acquisition systems (e.g. as high-speed transmitter/serializers) and trigger systems (e.g. for fast tracking or particle identification), as well as fault adaptive control systems.

Conveners: Clara Gaspar and Lauren Tomkins

Emerging technologies: 4a) Cooling and cryogenics

Under this topic, we invite talks on recent developments of systems to cool particle physics detectors and their on-detector electronics (microfluidic devices, evaporative techniques, multiphase cooling technologies etc.) as well as on advances in particle detectors technologies operating only a few degrees above absolute zero e.g. for gravitational waves detection, low energy beta decays, etc.

Convener: Bart Verlaat

Emerging technologies: 4b) MEMS

Miniaturized mechanical and electro-mechanical structures are being used in a number of applications such as accelerometers, sensors and actuators. Wafer post processing techniques are rapidly evolving. The focus of this session is the role of MEMS in scientific instruments.Micro-Electro-Mechanical Systems for detectors.

Conveners: Lina Sarro and Yevgen Bilevych

Emerging technologies: 4c) 3D integration

To exploit the full potential instigated by continuing developments of chip and sensor design and production it becomes crucial to interconnect layers through silicon vias. Additional interesting ingredients in 3D integration are wafer thinning and stacking of multiple layers of chips.

Conveners: Jurriaan Schmitz and Thomas Fritzsch

Emerging technologies: 4d) Photonics

Photonics is currently one of the most dynamic areas of research and development. Telecommunication profited from the progress in photonic integration processes; combination of advanced CMOS technologies and photonic circuits opens up interesting new opportunities and applications. Electro-optic conversion plays a crucial role also in the transmission and reception of analogue and digital information from/to particle detectors. Examples include optical sources including different types of lasers, modulators, optical amplifiers, passive and active integration, as well as novel research on three-dimensional sensor chips directly using optical technologies. We invite talks/papers related to photonics/optical communication in the areas of particle and astroparticle detectors, silicon-sensor readout, medical imaging, etc.

Convener: Jeroen Koelemeij

Emerging technologies: 4e) Precision engineering

In a wide range of experiments the frontiers of constructions are being pushed further. Examples are the vibrationless and noise-free suspension of mirrors in large interferometers for gravitational wave detection or the positioning of accelerator elements in the construction of a linear collider.

Conveners: Germana Riddone

Technology transfer: 5a) Industry Liaisons

Knowledge transfer and dissemination of results from scientific research to industry and society have become more and important. In recent years there is a demand on joined partnerships where scientists and industrial partners join forces already since the R&D phase. We encourage presentations on such joint research programs.

Conveners: Pieter de Witte and Hans Priem

Technology transfer: 5b) Health and healthcare

There are quite a few successful examples of nuclear physics and particle physics developments that have found their place in health and healthcare. There are ongoing developments in imaging techniques (like SPECT, PET, CT) combined with clever administration of radio-pharmaceuticals. In Europe an increasing number of proton therapy centers are being constructed that open opportunities for instrumentation developments.

Conveners: Jan Jacobs and Wei Long

Technology transfer: 5c) Biology&Material Science

This track covers a field where traditionally the interaction between academia and industry has been strong. Many different methods are being applied to study the samples of interest and the development is ever advancing. One can think of the use of lab-based systems using e.g X-ray diffraction, X-ray fluorescence, electron microscopy or mass spectrometry; SIMS, MALDI etc. Also the use of larger accelerator based facilities as free electron lase and synchrotrons play a big role in this field to study proteins, crystals and new materials like graphene.

Convener: Andy Buffler and David Kilgour