MPGD 2013 & 11th RD51 collaboration meeting

Report of Contributions

https://indico.cern.ch/e/258852

Contribution ID: **3** Type: **not specified**

Review talk: Higgs Discovery and Detector Instrumentation. Present and future

Monday 1 July 2013 10:05 (50 minutes)

Presenter: TITOV, Maksym (CEA/IRFU,Centre d'etude de Saclay Gif-sur-Yvette (FR))

Session Classification: Monday (MPGD morning session)

Contribution ID: **6** Type: **not specified**

The micromegas project for the ATLAS upgrade

Monday 1 July 2013 11:15 (25 minutes)

Micromegas is one of the detector technologies (along with the TGC-Thin Gap Chambers) that has been chosen for precision tracking and trigger purposes for the upgrade of the forward muon detectors of the ATLAS experiment in view of the LHC luminosity increase. We present a survey of the prototype micromegas detector performances obtained in recent test beam campaigns with high energy hadron beams at CERN. Results on spatial and angular resolution for perpendicular and inclined tracks, efficiency, time resolution, as well as the performance and operation of micromegas chambers in a magnetic field will be presented and compared to simulation. An overview of detector performance after neutron, X-ray, gammas and alphas exposure will also be presented.

Presenter: IAKOVIDIS, George (National Technical Univ. of Athens (GR))

Session Classification: Monday (MPGD mid-morning session)

Contribution ID: **7** Type: **not specified**

Solar space-born instruments and detectors for X-ray observations of the solar coron

Friday 5 July 2013 14:20 (20 minutes)

Presenter: GBUREK, szymon

Session Classification: WG1 - Technologies

Contribution ID: **8** Type: **not specified**

Status of the Triple-GEM Project for the Upgrade of the CMS Muon System

Monday 1 July 2013 11:40 (25 minutes)

The CMS GEM collaboration is developing a system of triple-GEM detectors for the endcap muon system (1.6 < |eta| < 2.4) of the CMS experiment at the LHC. GEM micro-pattern gas detectors are well-suited for the particle rates expected in that region at the planned high-luminosity LHC. With spatial resolution of order 100 microns, GEMs would enhance trigger capability and muon reconstruction. The status of the project is reviewed, highlighting achievements since its start in 2009. Several small and full-size prototypes were constructed with different geometries and techniques. resulting in the current baseline design. Measurements are reported for these prototypes using an X-ray source, a radioactive source, and a particle beam at the CERN SPS. The front-end and readout electronics design will be presented.

Presenter: TYTGAT, Michael (Ghent University (BE))

Session Classification: Monday (MPGD mid-morning session)

Contribution ID: **9** Type: **not specified**

First observation of electroluminescence in liquid xenon within THGEM holes - towards novel Liquid-Hole Multipliers

Friday 5 July 2013 14:40 (20 minutes)

Presenter: BRESKIN, Amos (Weizmann Institute of Science (IL))

Session Classification: WG1 - Technologies

Contribution ID: **10** Type: **not specified**

Spatial Resolutions of GEM TPC - A Novel Theoretical Formula and Comparisons to Latest Beam Test Data

Saturday 6 July 2013 09:00 (30 minutes)

Presenter: YONAMINE, Ryo (KEK)

Session Classification: WG4 - Simulation

Contribution ID: **11** Type: **not specified**

GEM upgrade of the ALICE TPC

Monday 1 July 2013 12:05 (25 minutes)

The ALICE (A Large Ion Collider Experiment at CERN) collaboration plans an upgrade of the detector during the second long shutdown of the LHC, where the interaction rate will be increased to 50 kHz for Pb-Pb collisions. This demands an operation in an ungated continuous mode of the Time Projection Chamber (TPC). Therefore, a gating grid can not be used to block the ion back-flow (IBF) to the drift volume. Gas Electron Multipliers (GEM) offer an intrinsic suppression of ions although not on the same level as a gating grid. In order to keep the distortions due to space charge on a manageable level, an IBF of 5 to 10 back drifting ions per incoming electron is required. To measure the IBF several gas detectors with a GEM amplication system have been built and set up. In order to arrive at the target IBF, different TPC gases such as Ar/CO2 (90/10), Ne/CO2 (90/10) and Ne/CO2/N2 (90/10/5) are compared. In our studies a high impact of the incident X-ray rate as well as the direction on the IBF has been observed suggesting a large influence of space charge on the IBF. To clarify this, systematic measurements over a wide range of different charge densities has been measured. In parallel detailed simulations using ANSYS and Garfield have been performed to complement the measurements and find the optimal set of parameters. Different hole geometries leading to different optical transparencies and their impact on the ion collection as well as the usage of a fourth GEM has been simulated to further reduce the ion backflow. A first prototype of an ALICE Inner Read-Out Chamber (IROC) was equipped with three large GEM foils as an amplication stage to demonstrate that the requirements both in detector performance as well as the stability of operation can be reached. The dE/dx resolution of the prototype was measured at the CERN PS and compared to the resolution of the MWPC IROC. Stability under LHC conditions has been evaluated during the ALICE p-Pb beamtime with the prototype mounted close to the interaction point. Preliminary results as well as the further R&D program will be presented.

Presenter: BALL, Markus (Technische Universitaet Muenchen (DE))

Session Classification: Monday (MPGD mid-morning session)

Contribution ID: **12** Type: **not specified**

Comparison of experimental data with simulation for the micro-TPC with InGrid pixel readout and its future studies using a new versatile test platform

Saturday 6 July 2013 09:30 (30 minutes)

Presenter: CHAUS, Andrii (C)

Session Classification: WG4 - Simulation

Contribution ID: **13** Type: **not specified**

The Swarming of the CLAS12 Tracker Project

Friday 5 July 2013 14:00 (20 minutes)

Presenter: BALL, Jacques (DAPNIA)

Session Classification: WG1 - Technologies

Contribution ID: **14** Type: **not specified**

Charging-up studies: the case of GEM and THGEM

Saturday 6 July 2013 10:00 (30 minutes)

Presenter: CORREIA, Pedro (University of Aveiro)

Session Classification: WG4 - Simulation

Contribution ID: **15** Type: **not specified**

Performances of large pixelized Micromegas detectors in the COMPASS environment

Monday 1 July 2013 12:30 (25 minutes)

New large Micromegas detectors are being developed for the future projects of the COMPASS collaboration at CERN. Compared to the present Micromegas detectors, these ones will have to stand a five time higher flux in hadron beam with a reduced discharge rate, and detect particles in the beam region with a pixelized read-out. Several pixelized prototypes with two different discharge rate reduction technologies (preamplification space with a GEM foil and resistive readout with buried resistors) have been tested in real COMPASS conditions since 2010. Two of them have been included in the spectrometer since 2012 instead of former Micromegas detectors, and participate in the track reconstruction. Their performances (detection efficiency, space and time resolutions, and discharge rates) for different beam intensities and magnetic field conditions are presented in this talk, so are the reconstruction software developments that optimize them. The impact of the new pixelized detect! ors on the COMPASS spectrometer track reconstruction is also presented, with a particular emphasis on the effect of the background reduction due to the improved cluster selection algorithm.

Presenter: THIBAUD, Florian (C)

Session Classification: Monday (MPGD mid-morning session)

Contribution ID: **16** Type: **not specified**

Micromegas mesh transparency, measurements and simulations

Saturday 6 July 2013 11:20 (30 minutes)

Presenter: KUGER, Fabian (Bayerische Julius Max. Universitaet Wuerzburg (DE))

Session Classification: WG4 - Simulation

Contribution ID: **17** Type: **not specified**

Progress on CLAS12 Micromegas detectors

Monday 1 July 2013 12:55 (25 minutes)

The electron accelerator of the Thomas Jefferson Laboratory (Virginia, USA) will soon be upgraded to deliver 12 GeV high intensity beams. This increase in the performance will give the opportunity to study the nucleon structure with an unprecedented accuracy. To meet this end, new equipments will be installed in the experimental areas, particularly in the Hall B/CLAS spectrometer. One of the most challenging aspects is the installation of a Central Tracker surrounding the target, dedicated to the detection of particles emitted at large angles. Micromegas detectors have been chosen to be a major element of this new equipment, due to their high rate capability as well as their robustness and light material. Using the recent bulk technology, one part of these gaseous detectors are planned to be assembled in thin cylinders to maximize the acceptance. We report on the performance of a curved resistive Micromegas full size prototype. The other part will be composed of 0.1 m² flat resistive Micromegas. We present here a detailed comparison between such a detector produced by the CIREA company and the same produced by the CERN workshop. The study also includes systematic measurements of the performance of resistive Micromegas, in particular ageing effects and the improvement of the S/N ratio without the usual protections on the electronics.

Presenter: CHARLES, Gabriel

Session Classification: Monday (MPGD mid-morning session)

Contribution ID: **18** Type: **not specified**

Quintuple-GEM CsI Ring Imaging Cherenkov Detector

Friday 5 July 2013 15:00 (20 minutes)

Presenter: ZAJAC, Stephanie (Stony Brook)

Session Classification: WG1 - Technologies

Contribution ID: **19** Type: **not specified**

Ion Mobility Measurements

Presenter: VENTURA CORTEZ, André Filipe (LIP Coimbra)

Contribution ID: **20** Type: **not specified**

Gas gain and energy transfer rate measurements in Ar-CO2 mixtures

Saturday 6 July 2013 11:50 (30 minutes)

Presenter: SAHIN, Ozkan (Uludag University (TR))

Session Classification: WG4 - Simulation

Contribution ID: **21** Type: **not specified**

Development of Large Area Cryogenic Gaseous Photo Multipliers for Dark Matter Search

Friday 5 July 2013 15:20 (20 minutes)

Presenter: GIBONI, Karl Ludwig (Shanghai Jiao Tong U.)

Session Classification: WG1 - Technologies

Contribution ID: **22** Type: **not specified**

Development of the GEM-based Read-Out Chambers for ALICE TPC

Friday 5 July 2013 16:00 (20 minutes)

Presenter: GASIK, Piotr Jan (Technische Universitaet Muenchen (DE))

Session Classification: WG1 - Technologies

Contribution ID: **23** Type: **not specified**

Large Area GEM for current and future experiments in Hall A at JLab

Friday 5 July 2013 16:20 (20 minutes)

Presenter: GNANVO, Kondo (University of Virginia (US))

Session Classification: WG1 - Technologies

Contribution ID: **24** Type: **not specified**

Review talk: MPGDs for TPC readouts at the Energy, Intensity and Cosmic Frontiers

Monday 1 July 2013 14:50 (40 minutes)

Presenter: COLAS, Paul (CEA/IRFU,Centre d'etude de Saclay Gif-sur-Yvette (FR))

Session Classification: Monday (MPGD afternoon session)

Contribution ID: **25** Type: **not specified**

Construction and first experience with large size MicroMegas chambers

Friday 5 July 2013 16:40 (20 minutes)

Presenter: SEKHNIAIDZE, Givi (Universita e INFN (IT))

Session Classification: WG1 - Technologies

Contribution ID: **26** Type: **not specified**

Development of a GEM-TPC for H-dibaryon Search Experiment at J-PARC

Monday 1 July 2013 15:30 (25 minutes)

A TPC has been developed for J-PARC E42 experiment to search for H-dibaryon in (K-, K+) reaction. An event with 2 pi- and 2 protons decaying from H-dibaryon is searched for inside the TPC. The TPC has octagonal prism shape drift volume with about 50 cm diameter with 55 cm drift length filled with Ar-CH4 (90:10) gas. At the end of the drift volume, 3-layer GEMs are equipped. In order to analyze momenta of produced particles, the TPC is applied with 1 T dipole magnetic field parallel to the drift electric field with a uperconducting Helmholz magnet. In order to maximize the acceptance of H-dibaryon events, a diamond target is installed inside the TPC drift volume, in a cylindrical hole opened from the top to the middle of the drift volume. Since extremely high-rate K- beam is directly injected into the TPC drift volume to the target, a gating grid and GEMs are adopted to suppress positive-ion feedback. We present design and status of R&D. We show performance of prototype with high-intensity beams at RCNP (Research Center for Nuclear Physics) at University of Osaka, and with a UV laser under magnetic field at J-PARC.

Presenter: SAKO, Hiroyuki (Japan Atomic Research Agency)

Session Classification: Monday (MPGD afternoon session)

Contribution ID: **27** Type: **not specified**

Development and performance of large-scale triple GEM detectors for CMS

Friday 5 July 2013 17:00 (20 minutes)

Presenters: BOUHALI, Othmane (Texas A & M University (US)); BOUHALI, Othmane (Service de Physique des Particules Elementaires)

Session Classification: WG1 - Technologies

Contribution ID: **28** Type: **not specified**

The Cylindrical-GEM detectors for the KLOE-2 Inner Tracker

Monday 1 July 2013 15:55 (25 minutes)

The upgrade of the KLOE detector at the DAFNE Φ-factory foresees the insertion of a new Inner Tracker device around the interaction region, composed by four tracking layers with diameters from 260 mm to 410 mm and an active lenght of 700 mm. Each layer is realized as a cylindrical triple-GEM detector, a solution that allows to keep the total material budget under 2\% of X_0, of utmost importance to limit the multiple scattering of low-momentum tracks at KLOE-2, and to minimize dead spaces. The peculiar readout pattern with XV strips provides a spatial resolution of about 200 μm on both views. A dedicated readout system has been developed within the KLOE-2 collaboration. It is composed by a digital readout front-end card based on the GASTONE ASIC and a General Interface Board with a configurable FPGA architecture and Gigabit Ethernet. The construction of the four C-GEM layers has been completed been built, the detectors have been tested with beta source and cosmic-ray muons. The insertion inside the KLOE apparatus is foreseen in June 2013. The construction procedure and the results of the validation tests will be reported.

Presenter: MORELLO, Gianfranco (Univ. degli Studi della Calabria)

Session Classification: Monday (MPGD afternoon session)

Contribution ID: **29** Type: **not specified**

Performance of a Large GEM-TPC at FOPI

Monday 1 July 2013 16:20 (25 minutes)

A large TPC (75 cm length, 15 cm radius, ˜10000 readout channels) with GEM amplification operating in an ungated mode has been built and installed at the FOPI experiment at GSI, Darmstadt, where it was successfully tested in a physics campaign (pion-beam on different targets). From the recorded data, charged particle tracks entering the GEM-TPC are reconstructed using a fully 3-dimensional clustering algorithm and then matched with the surrounding FOPI tracking detectors. In this talk the performance of the detector both with cosmics and in physics beams is presented: Spatial resolution from the measurements of cosmics; Distortions due to field cage inhomogeneities in comparison with Finite Element simulations; Vertex reconstruction capabilities; Specific energy loss (dE/dx) performance for Pions, Kaons, Protons and Deuterons as a function of the particle momentum. The above performance results will be complemented with first results from physics analysis. This successful operation of such a challenging detector is an important milestone towards an upgrade of the ALICE TPC with GEM technology. This work has been supported by the BMBF and the DFG Cluster of Excellence “Universe” (Exc153)

Presenter: BOEHMER, Felix Valentin (Technische Universitaet Muenchen (DE))

Session Classification: Monday (MPGD afternoon session)

Contribution ID: **30** Type: **not specified**

Development of Micromegas detectors for neutron time-of-flight measurements

Monday 1 July 2013 17:55 (25 minutes)

Several types of Micromegas based detectors have been developed and are being used for neutron time-of-flight measurements in facilities like n_TOF at CERN. A transparent neutron flux monitor is installed permanently in the neutron beam to
measure the incident neutron flux, while a similar device is being developed for the NFS facility at GANIL. An XY-strip and a pixelized Micromegas have been used to determine the spatial distribution of the neutron beam as a function of the neutron energy. Other Micromegas detectors have been used for fission and (n,α) measurements and for fission tagging in the neutron capture measurements. The performance of those detectors will be presented here.

Presenter: PAPAEVANGELOU, Thomas (CEA/IRFU,Centre d'etude de Saclay Gif-sur-Yvette (FR))

Session Classification: Monday (MPGD evening session)

Contribution ID: **31** Type: **not specified**

The NIFFTE project

Monday 1 July 2013 18:20 (25 minutes)

The NIFFTE project is a double sided fission TPC with micromegas readout that is being developed to measure the energy dependent neutron induced cross sections of the major and minor actinides to an accuracy better than 1%. Our collaboration, a group of 7 universities and 4 national laboratories, has undertaken the task of building the first TPC for this purpose. Neutron-induced fission cross sections have been measured with ionization/fission chambers for decades. To achieve the unprecedented accuracy levels required for applications, however, one needs not only to aggregate statistics but also to address major sources of systematic uncertainties that have plagued previous measurements, such as target and beam non-uniformities, misidentification of alpha/light charged particles and fission fragments, and uncertainties inherent to the reference standards used. In this talk I will present the fission TPC concept, and discuss the performance of the device gleaned from the first data.

Presenter: RUZ ARMENDARIZ, Jaime (Lawrence Livermore Nat. Laboratory (US))

Session Classification: Monday (MPGD evening session)

Contribution ID: **32** Type: **not specified**

Review talk: simulation tools for MPGDs

Presenter: VEENHOF, Rob (Uludag University (TR))

Contribution ID: **33** Type: **not specified**

Potential Ion gating using GEM: Experiment and simulations

A micro pixel chamber (uPIC), the development of which started in 2000 as a kind of micro pattern gas detector, has a high gas gain over 6,000 in stable operation, a large detection area of 900 cm2, and a fine position resolution of about 120 um, and it is used at MeV gamma-ray astronomy, dark matter search, medical imaging, neutron imaging, small-angle X-ray scattering, and so on. However, in its development, the verification using a simulator has not been useful so much, because conventional simulation results explain the partial experimental data only. On the other hand, some uPIC applications require the fluctuation of gas avalanche and the signal wave form for their recent improvements, therefore there is need of updating the uPIC simulation. For this purpose, we adopt Garfield++, which is developed for the calculation of microscopic avalanche, and are trying to explain the experimental data. In this paper, we report the simulation study of the gas multiplication, the electron collection efficiency, and signal wave form.

Presenters: GROS, Philippe; GROS, Philippe (CERN); GROS, Philippe (Saga University)

Contribution ID: **34** Type: **not specified**

Direct charge digital readout of dual phase xenon Time Projection Chambers with GridPix

Presenter: ALFONSI, Matteo (NIKHEF (NL))

Contribution ID: **35** Type: **not specified**

Recent advances with THGEM detectors”

Presenter: BRESSLER, Shikma (Weizmann Institute of Science (IL))

Contribution ID: **36** Type: **not specified**

Novel ideas for fabrication of hard X-ray imagers by combination of nano photo converter or nano scintillator with GEM detector

Monday 1 July 2013 16:45 (1h 10m)

One of the most marvelous applications of GEM is hard X-ray imaging. We suggested a novel nanostructure photo converter combined with GEM detector to increases the efficiency of X-ray detection by increasing the surface to volume ratio. Since the energy is deposited in the volume of the photo converter but the electrons can only escape from the surface, so by increasing the surface to volume ratio, it is expected that the quantum efficiency of photon to electron conversion is also improved. Experimentally, by using the Anodic Aluminum Oxide (AAO) membrane with conformal deposition of a wide variety of metals and metal oxides, extraordinary control over the thickness of these nano structured photo-cathodes can be achieved. The Monte Carlo simulation results also show that by suitable optimizing the dimension of the nano photo converter, the efficiency of the converter and also the performance of the whole detector can be improved. This nano photo converter is fabricated an! d the experimental test is currently underway The other proposed new architecture for hard X-ray imaging is a hybrid nano scintillator-gas detector based on the ZnO nanostructure, which can give a better contrast and spatial resolution in comparison with traditional imagers. In this imager, the different refractive indexes between the ZnO nanostructure and the membrane, acts as a light guide that prevents the generated optical photons to exit from the ZnO nanostructure, which improves the spatial resolution of the imager. By suitable selecting the length of the ZnO nanostructure for the X-ray energy range and the type of position sensitive sensor for the scintillation light, the efficiency of the imager can also be improved. The proposed nano membranes are the AAO or the polycarbonate track-etched membrane, which deposition of scintillator material in these nano membranes is possible by simple and cheap electro deposition method. The GEM with Cesium Iodide coating is also a suitable position sensitive detector to dete! ct the UV generated in ZnO nano scintillator in this hybrid nano scintillator-gas detector. The X-ray imager based on ZnO nanowires is simulated, designed and fabricated and tested with a CMOS imaging sensor. The test of these imagers with GEM is underway.

Presenter: SARAMAD, Shahyar

Session Classification: Monday (poster session)

Contribution ID: **37** Type: **not specified**

Application of 2D-GEM with Strip Readout in Synchrotron Radiation

Monday 1 July 2013 16:45 (1h 10m)

With the faster time data acquisition system and micro-structure GEM gaseous detector, the two-dimensional position sensitive X-ray detection system based 704 electronic channels has developed in Institute of High Energy Physics in the past few years. There were 267 readout strips of 0.l93mm width and the pitch of strips was 0.752mm in X direction. In Y direction, there were 437 readout strips of 0.355mm and the pitch of strips was 0.457mm. To adjust the time search window, the peak information of the signal would be obtained after the signal of strip amplified by the charge sensitive electronic and digitized into FPGA module. Finally, the two-dimensional position of original ionization point would be got by the adjacent strips distribution information of the center of gravity method. The detection system has the active area of 200mm×200mm, the position resolution less than 200μm(Full Width Half Maximum) and effective readout time less than 20μs. From 8keV to 18keV of ! the X-ray energy, the detection system could be used to get the two dimensional imaging. The diffraction imaging measurement of the sample of SiO2 crystal has done in synchrotron radiation experiment terminal。 The study of another detector will also be reported. Used GEM as primary electronic amplifier, "GEM+Micromegas"detector could avoid the disadvantage of the last GEM film's discharge to damage, but also could set the the Micromegas working voltage lower and reduce the discharge or spark. It has stable working time in the same gain and can achieve higher gain performance (> 106). The study of "GEM+Micromegas"detector has done in synchrotron radiation in the X-ray energy range of 6keV ˜ 20keV, the stable performance and the energy resolution that was from10% to 25% has been obtained.

Presenter: ZHOU, Jianrong

Session Classification: Monday (poster session)

Contribution ID: **38** Type: **not specified**

Study of long-term operation of triple-GEM detectors for the high rate environment in CMS

Monday 1 July 2013 16:45 (1h 10m)

The CMS GEM collaboration is developing Gas Electron Multiplier (GEM) detectors for use in the endcap muon detector of the CMS experiment. The GEM detectors can operate well in the environment expected at the high-luminosity LHC. To insure long-term operation of the detectors, we test for gain drop, gain non-uniformity, dark current increase, discharge rate increase, and resolution loss after chamber aging. We continuously monitor the response of a detector irradiated by a Cs 137 source using the Gamma Irradiation Facility (GIF) at CERN. The detector we test was constructed using the new "NS2" method for stretching a GEM foil, and was built with carefully chosen materials and components. Outgassing tests are performed to validate the use of these components. Important parameters are monitored during the testing to identify the causes and effects of possible aging. Based on the results, we establish assembly methods and operational parameters to insure good performance at high luminosity

Presenter: MERLIN, Jeremie Alexandre (Institut de Physique et Chimie des Materiaux de Strasbourg (FR))

Session Classification: Monday (poster session)

Contribution ID: **39** Type: **not specified**

Progresses in the production of large-size THGEM boards

Monday 1 July 2013 16:45 (1h 10m)

The THicK GEM (THGEM) electron multipliers are derived from the GEM design, by scaling the geometrical parameters and changing the production technology: THGEMs are PCBs produced by etching and drilling. THGEMs can be produced in large series and large size at moderate cost with standard PCB technology, in spite of the large number of holes: some millions per square meter. Small-size (a few cm2) detectors exhibit superb performance, while larger ones exhibit gain and response uniformity limitations. The difficulty of reproducing with larger detectors the results obtained with the small ones are strictly related to production aspects. The typical industrial requirements and quality control adequate for PCB dedicated to electronics application, are not satisfactory for THGEMs. We have studied with a systematic approach several aspects concerning the material (type and thickness of the fiberglass plates) and the production procedure, in particular the cleaning and polishing stages. The net result is the production of large THGEM multipliers reproducing the performance of the small ones. We report in detail about the studies and the results.

Presenter: LEVORATO, Stefano (Universita e INFN (IT))

Session Classification: Monday (poster session)

Contribution ID: **40** Type: **not specified**

Gain Uniformity tests on full scale triple GEM detectors for CMS high Eta upgrade

Monday 1 July 2013 16:45 (1h 10m)

The CMS GEM collaboration has proposed an upgrade of the CMS forward muon system with triple-GEM detectors. An extensive R & D program has demonstrated that these detectors have the rate capability and radiation resistance needed to operate in the environment of the high-luminosity LHC. Moreover, their excellent position resolution will enhance the performance of muon triggering and reconstruction. These GEM detectors are the largest ones ever built. They have a trapezoidal shape, 1 m long, with parallel sides of 20 and 40 cm. It is important to insure uniform performance over the chamber area for all 144 chambers in the system. In this talk we describe a procedure for certifying the gain uniformity over the sensitive area of the detectors. An x-ray gun is used to illuminate different spots on the chamber, while the relative performance is measured in real time. We use the Scalable Readout System (SRS) which was developed by the RD51 collaboration. We describe the steps required for performance certification and we report measurements from the first full-size prototypes.

Presenter: ARMAINGAUD, Christopher (Institut de Physique et Chimie des Materiaux de Strasbourg (FR))

Session Classification: Monday (poster session)

Contribution ID: **41** Type: **not specified**

High Resolution Single Photon Scanning Device for TGEMs

Monday 1 July 2013 16:45 (1h 10m)

TGEM based micropattern gaseous photon detecotrs suffer from inefficiencies on photo-electron collection and detection due to the microstructure of the TGEM's surface. An exploration of this structure can lead to deeper understanding and optimization of construction parameters. Built from a proper optical section attached to a three dimensional scanning device a focused single photo-electron response could be measured, with 0.07mm precision. This allows separate high resolution mapping of the photo-electron detection probability and the TGEM avalanche gain. The presentation will give a detailed description of the setup and demonstrate the applicability in MPGD quality control. The first interesting results include the experimental quantification of the efficiency drop in the critical symmetry lines and points, and the demonstration that each TGEM hole has an individual constant gain covering its hexagonal collection zone.

Presenter: HAMAR, Gergo (MTA KFKI RMKI)

Session Classification: Monday (poster session)

Contribution ID: **42** Type: **not specified**

The simulation of gas avalanche in a Micro Pixel Chamber using Garfield++

Monday 1 July 2013 16:45 (1h 10m)

A micro pixel chamber (uPIC), the development of which started in 2000 as a kind of micro pattern gas detector, has a high gas gain over 6,000 in stable operation, a large detection area of 900 cm2, and a fine position resolution of about 120 um, and it is used at MeV gamma-ray astronomy, dark matter search, medical imaging, neutron imaging, small-angle X-ray scattering, and so on. However, in its development, the verification using a simulator has not been useful so much, because conventional simulation results explain the partial experimental data only. On the other hand, some uPIC applications require the fluctuation of gas avalanche and the signal wave form for their recent improvements, therefore there is need of updating the uPIC simulation. For this purpose, we adopt Garfield++, which is developed for the calculation of microscopic avalanche, and are trying to explain the experimental data. In this paper, we report the simulation study of the gas multiplication, the electron collection efficiency, and signal wave form.

Presenter: TAKADA, Atsuki

Session Classification: Monday (poster session)

Contribution ID: **43** Type: **not specified**

GET: A Generic Electronic System for TPCs for nuclear physics experiments

Monday 1 July 2013 16:45 (1h 10m)

GET is an international program to develop a versatile, reconfigurable and scalable medium sized system to cover nuclear physics and particle requirements for instruments with up to 32k electronic channels with event rates of up to 1KHz. Signals are sampled with frequency of up to 100MHz on 512 deep circular capacitive arrays. 12bit time-stamped reduced data is transferred via micro-TCA units having a total band width of 10Gbit/s per unit (3units for 32 Kchannels). A 4 level fully numeric trigger is integrated in this development. In this presentation a short description of the system architecture is given. Results coming from different MICROMEGAS, GEM, DSSSDs prototypes will be presented. GET developments will be implemented at ACTAR (GANIL,FR), AT-TPC (NSCL, US) , SAMURAÏ-TPC (RIKEN, Jap,) J-PARC, MINOS (IRFU, FR), N-TOF(CERN) and other laboratories/experiments. Production of the modules are programmed for 2013 and early 2014.

Presenter: POLLACO, Emanuel (CEA)

Session Classification: Monday (poster session)

Contribution ID: **44** Type: **not specified**

He-CF4 and He-CH4 mixtures for THGEM-based GPMs operating at cryogenic temperatures

Monday 1 July 2013 16:45 (1h 10m)

This work presents the experimental measurements obtained for UV-induced photo-electron extraction efficiency from a CsI photocathode into He with CF4 and CH4 gas mixtures. A 1000Å CsI photocathode was deposited on a gold plated THGEM for photo-electron conversion. Charge-gain measurements were obtained with a Single-THGEM detector operating in these gas mixtures using a UV lamp for the extraction of photo-electrons. Charge-gains in excess of 10ˆ5 were obtained for gas mixtures containing percentages of quencher higher than 20% while photo-electron extraction efficiency was ˜50% for He/CF4 and ˜30% for He/ CH4. A discussion for future cryogenic applications is presented.

Presenter: BRESSLER, Shikma (Weizmann Institute of Science (IL))

Session Classification: Monday (poster session)

Contribution ID: **45** Type: **not specified**

Pattern recognition of Xe-136 double beta decay signal in a High Pressure Xe gaseous TPC

Monday 1 July 2013 16:45 (1h 10m)

Neutrinoless double beta decay could give essential information about neutrino mass and nature. One of the nowadays experimental approaches to look for the double beta decay is to use a high pressure gaseous TPC due to the good energy resolution and the topological information of each event that can be obtained with a pixelized gaseous detector. Pattern recognition may help to discriminate background, a key point for these experiments. In this work the topology of the Xe-136 double beta decay events simulated in a high pressure Xe TPC has been studied, as well as that of the typical competing backgrounds. Different discrimination algorithms based on graph theory have been developed to perform an automated analysis which is able to reduce the background in three orders of magnitude in the region of interest of the Xe-136 Qββ while keeping a high efficiency of 40% for the signal when applied to Monte Carlo simulated data. The effect of the diffusion in the topological capabilities is also studied as well as are discussed possible ideas for further improvement in the discrimination algorithms.

Presenter: SEGUI IGLESIA, Laura (Departamento de Fisica Teorica-Facultad de Ciencias-Universidad)

Session Classification: Monday (poster session)

Contribution ID: **46** Type: **not specified**

Xe-TMA for high-pressure Time Projection Chambers

Monday 1 July 2013 16:45 (1h 10m)

Xe-TMA is a strong Penning mixture at high pressure presumably due to a Nature fine-tuned resonant energy-transfer of Xenon low-lying metastable states to TMA ionized states. Xe-TMA offers many potential advantages for a high pressure gaseous TPC aimed at ultimate energy resolution and topological information, through:
1) An anticipated reduction of the Fano factor, theoretically allowing for beyond-intrinsic energy resolution in Xenon.
2) Scintillation in longer wavelengths more suited to standard photo-multipliers, by wave-length-shifting the 170nm Xe 2nd continuum.
3) Improved drift and diffusion characteristics, allowing for enhanced event topology.
4) A theoretical possibility for electroluminescence proportional multiplication at reduced fields.
A whole survey of these aspects requires various technical approaches and complementary experiments. In the framework of the R&D of the neutrinoless double beta decay experiment NEXT, we will present a first step towards a systematic characterization of this mixture as well as a detailed comparison with simulation.

Presenter: PONS, Pablo

Session Classification: Monday (poster session)

Contribution ID: **47** Type: **not specified**

Performance Studies of a MicroMeGas Chamber in the ATLAS Environment

Monday 1 July 2013 16:45 (1h 10m)

Five small prototype MicroMeGas detectors were positioned in the ATLAS detector during LHC running at sqrt(s) = 7 and 8 TeV. A 9 x 5 cm2 two-gap detector was placed in front of the electromagnetic calorimeter and four 10 x 10 cm2 on the ATLAS Small Wheels, the first station of the forward muon spectrometer. The one attached to the calorimeter was exposed to rates that are orders of magnitude higher than the rates expected in the New Small Wheel after the Phase I upgrade of the ATLAS detector for the sLHC (15 kHz for $\eta \approx 2.7$). We present the results of the analysis (ageing tests, luminosity measurement) of the data collected with these MicroMeGas detectors.

Presenter: NTEKAS, Konstantinos (National Technical Univ. of Athens (GR))

Session Classification: Monday (poster session)

Contribution ID: **48** Type: **not specified**

Radiopurity control in rare event experiments using micromegas

Monday 1 July 2013 16:45 (1h 10m)

Micromesh gas amplification structures (Micromegas) are being used or considered as readout of Time Projection Chambers (TPCs) in the field of Rare Event searches (dealing with dark matter, double beta decay or solar axions). The topological information of the events offered by these gaseous detectors could provide a very powerful tool of signal identification and background rejection. But in addition, in this kind of experiments the radiopurity of the detector components and surrounding materials must be thoroughly controlled in order to keep the experimental background as low as possible. A screening program based mainly on gamma-ray spectrometry using an ultra-low background HPGe detector in the Canfranc Underground Laboratory is being developed for several years, with the aim to measure the activity levels of materials used in the micromegas planes and also in other components involved in the experimental set-up: gas vessel, field cage, electronic boards, calibration system or shielding. The techniques and equipment used to measure the radiopurity of materials will be described and the main results will be presented and discussed. In particular, first measurements of the activity levels of micromegas readouts of the microbulk type produced at CERN indicate that they are already comparable to the cleanest readout systems in low background experiments and it should be possible to further improve these levels after dedicated development

Presenter: CEBRIAN, Susana (University of Zaragoza)

Session Classification: Monday (poster session)

Contribution ID: **49** Type: **not specified**

Study on the effect of dust on leakage current of bulk micro-MEGAS detector

Monday 1 July 2013 16:45 (1h 10m)

In this paper, the effect of dust trapped in avalanche region on the leakage current of standard bulk micro-MEGAS detector is studied. Pyralux PC1025 layers of DuPont are introduced in bulk technique and 30×30mm bulk micro-MEGAS detector is fabricated with pillars of 300μm diameter. Stainless steel woven mesh with pitch of 40μm is used as avalanche electrode. PMMA (polymethyl methacrylate) powder is added artificially as dust to avalanche region after the lithography technique. Leakage current with and without powder is tested in air and results of two detectors are depicted in Fig.1 and Fig.2. The green line in Fig.1 and Fig.2 is the leakage current without powder and the red line is the leakage current with powder. Test results indicate that PMMA powder trapped in avalanche region has obvious effect on leakage current. Fig.1. leakage current test result of detector 1 Fig.2. leakage current test result of detector 2 Preliminary work indicates that leakage current increases when dust is trapped in avalanche region, unfortunately quantitive statistics of dust and the effect has not been revealed, which is being studied in our lab. The effect of different powder dust (CeO2, Al2O3, Fe2O3) with different size is also being studied.

Presenter: WANG, Bo (IHEP)

Session Classification: Monday (poster session)

Contribution ID: **50** Type: **not specified**

Towards smaller gap microbulks

Monday 1 July 2013 16:45 (1h 10m)

Small gap micromegas detectors (< 50 μm) are optimized for high pressure applications. Combining the microbulk manufacturing technique with a small gap can result in attractive detectors for rare event searches, in particular double beta decay or dark matter search. We will present results obtained with small gap microbulks (25 and 12.5 μm) as well as their limitations.

Presenter: FERRER RIBAS, esther

Session Classification: Monday (poster session)

Contribution ID: **51** Type: **not specified**

Development of GEM gas detectors for X-ray crystal spectrometry

Monday 1 July 2013 16:45 (1h 10m)

The high-resolution X-ray spectroscopy is a powerful tool for diagnosing the properties of tokamak plasmas. The Bragg crystal X-ray spectroscopy has become well-established technique for diagnosing important plasma parameters. The characteristic X-ray radiation emitted by highly ionized metal impurities provides accurate information on the crucial plasma parameters such as impurity concentrations, ion temperature, and the toroidal rotation velocity [1,2]. High-resolution X-ray diagnostics for MCF devices is expected to allow monitoring the plasma radiation emitted by highly ionised impurity elements. For the purpose of detecting X-ray lines intensities from the energy resolved diagnostics two detectors based on Triple GEM amplification followed by the strip readout electrode were developed in order to measure intensities of soft X-ray radiation diffracted by the crystal suitable for the specific soft X-ray energy range. The characteristic X-ray lines are planning to be measured by new generation energy-resolved micropattern gas detectors with 1-D position reconstruction capability. The analogue signal processing electronics should allow on-line energy measurement and position reconstruction with the precision better than the strip pitch. The monitoring system should provide the measurements of the plasma evolution in time-slices corresponding to 10 ms exposures. In this work we present the development of Triple-GEM detectors guiding to fulfil the mentioned above conditions for monitoring the X-ray emitted by tokamak plasma in the energy region from 2 to 10 keV. The constructed detector has 256 readout channels with the dedicated system for on-line data stream processing. The detector window is of about 20x10 cm2 size. As a conversion medium Ar:CO2 (70:30) gas mixture of 1.5 cm thickness was chosen. Selected results of measurement tests applying the 55Fe and X-ray generator sources will be presented. REFERENCES: [1] K-D Zastrow, H W Morsi, M Danielsson, M G von Hellermann, E Källne, R König, W Mandl and H P Summers,
J Appl Phys 70, 6732 (1991) [2] K. W. Hill et al., Rev. Sci. Instrum. 79, 10E320 (2008)

Presenter: CHERNYSHOVA, Marina

Session Classification: Monday (poster session)

Contribution ID: **52** Type: **not specified**

Beam Tracking with Micromegas & Wire Chambers in Secondary Electron Detection Configuration

Monday 1 July 2013 16:45 (1h 10m)

For nuclei identification purposes at the focal plane of S3, new experimental area of SPIRAL2 at GANIL, it is necessary to reconstruct the trajectories of the nuclei. Classical tracking detectors in beam would generate a lot of angular and energy straggling due to their thickness. One solution could be the use of Se-D (Secondary electron Detection). It consists of only a thin emissive foil in beam with a low pressure gaseous detector off-beam to detect the secondary electrons ejected from the foil. Moreover, this type of detectors could also be used for classical beam tracking at low energy, or for example at NFS (GANIL) for the FALSTAFF experiment to reconstruct Fission Fragments trajectories. Several low pressure gaseous detectors (wire chambers and micromegas) have been constructed and tested since 2008. High counting rate capabilities and good time resolution, obtained in previous tests, convinced us to make a new big 2D prototype wire chamber and a 2D bulk micromegas at low pressure. For the first time, spatial resolution of the micromegas at low pressure was measured. Different tests have been done in order to characterize time and spatial properties of both prototypes.

Presenter: FERNANDEZ, Begoña (CNA-University of Seville)

Session Classification: Monday (poster session)

Contribution ID: **53** Type: **not specified**

A Micromegas detector for 222Rn emanations measurements

Monday 1 July 2013 16:45 (1h 10m)

The 222Rn emanation has significant contribution in the overall background for rare event searches experiment, in order to measure this emanations a high sensitivity detector have been designed with the aim of a minimum detectable activity of 100 μBq. The detection method is the electrostatic collection of the 222Rn daughters on a Micromegas detector. Using a chamber with a volume of 21.2 l for the collection of 218Po and 214Po progeny of 222Rn and a 12 x 12 cm2 pixelized Micromegas for the α detection. The advantages of the Micromegas detectors are the low intrinsic radioactivity and the track reconstruction of α's, having excellent capabilities for event discrimination.

Presenter: GARCIA PASCUAL, Juan Antonio (Facultad de Ciencias-Universidad de Zaragoza)

Session Classification: Monday (poster session)

Contribution ID: **54** Type: **not specified**

A successful application of thinner-THGEMs

Monday 1 July 2013 16:45 (1h 10m)

The thinner-THGEMs (Thick Gas Electron Multipliers), typically with 0.2mm thickness, 0.2mm hole diameter, 0.7mm pitch and a narrow (5˜20μm) rim, represent a promising option for a parallax-free curved gas detector with relative high spatial resolution and large dynamic range of gain. In this paper we report the study of thinner-THGEMs that have been developed by UCAS (university of Chinese Academy of Sciences). The performance was monitored for over 3 months using Cu X-ray tube. In general, a gain of 1X104 was obtained with only a single board in Ar/iC4H10 (97:3). The dependence of gain on the pressure and temperature was measured and it shows a ˜12% gain drop with a 5 degree temperature increase at 1 atm. The performance of prototype working under high counting rate is also studied. Based on the previous studies, a curved thinner-THGEM chamber with a 48 degree acceptance and 0.2°angle resolution at 20cm radius has been developed for diffraction studies at Beijing Synch! rotron Radiation Facility (BSRF). The result shows a 0.14°angle resolution can be achieved with current data acquisition mode.

Presenter: QIAN, Liu (UCAS)

Session Classification: Monday (poster session)

Contribution ID: **55** Type: **not specified**

Review talk: simulation tools for MPGDs

Tuesday 2 July 2013 09:00 (40 minutes)

Presenter: VEENHOF, Rob (Uludag University (TR))

Session Classification: Tuesday (MPGD morning session)

Contribution ID: **56** Type: **not specified**

Potential Ion gating using GEM: Experiment and simulations

Tuesday 2 July 2013 09:40 (25 minutes)

Positive ion feed-back can be problematic in a high precision Time Projection Chamber (TPC) as proposed for the International Linear Collider (ILC). Use of a traditional wire gating device is difficult because of the high magnetic field and the module structure. F. Sauli proposed, in 2006, the use of a Gas Electron Multiplier (GEM) as a gating device. We have measured the electron transparency for a 14μm thick GEM in a 1T magnetic field. The transparency does not meet the requirement for a TPC at the ILC. We performed a simulation study using Garfield++ to understand the important parameters. Simulations show that a new GEM structure with wider aperture, for example a hexagonal honeycomb structure, can provide improved the performance as a gate. Results of measurements will be compared to the simulation and predicted performance of the new GEM structure will be des

Presenter: GROS, Philippe

Session Classification: Tuesday (MPGD morning session)

Contribution ID: **57** Type: **not specified**

Direct charge digital readout of dual phase xenon Time Projection Chambers with GridPix

Tuesday 2 July 2013 10:05 (25 minutes)

Dual phase and high pressure noble gas Time Projection Chambers (TPC) are successfully employed in rare event experiments such as Dark Matter and neutrino-less double beta decay searches. The simultaneous measurement of the scintillation light and the ionisation electrons, converted to scintillation via the electroluminescence mechanism, allows for accurate 3D-reconstruction of the energy deposition and effective particle identification. An alternative method for the measurement of the ionisation channel is the direct detection of the electrons by equipping the TPC with a charge-sensitive device, such as GridPix. This is a Micro-Pattern Gaseous Detector consisting of a mesh stretched 50 micron above a pixelated readout chip. It is fabricated with wafer post-processing techniques with well defined materials, therefore ensuring high radio-purity and low outgassing. The high granularity of a pixel readout, the pixels'low noise and high detection efficiency for single electrons allow for the measurement of the ionisation signal by the amount and the pattern of the hit pixels. We evaluate here, for the case of a dual phase xenon TPC, the benefits in term of energy resolution as a function of constructive parameters such as the pixel pitch. Moreover we report on the R&D at Nikhef with current Gridpix devices, which utilise the Timepix chip readout with a 55 micron pixel pitch. The gain and the detection efficiency for single electrons have been measured for several pure and quenched, argon or xenon gas mixtures. The behaviour of the Timepix chip at liquid xenon temperature has been also studied.

Presenter: ALFONSI, Matteo (NIKHEF (NL))

Session Classification: Tuesday (MPGD morning session)

Contribution ID: **58** Type: **not specified**

Recent advances with THGEM detectors

Tuesday 2 July 2013 10:30 (25 minutes)

The Thick Gas Electron Multiplier (THGEM) is a simple and robust electrode suitable for large area detectors. The results of extensive comparative studies of the physical properties of different THGEM-based structures will be reviewed. The focus is on newly suggested THGEM-like configurations as well as on recently developed characterization methods. We will report on the properties of THGEM electrodes followed by traditional induction gaps and of other, WELL structures –namely THGEM electrodes directly coupled to an anode plate. In both cases, the readout pads are decoupled through resistive anodes. We will discuss the effects of different resistive configurations on the gas gain, avalanche extension, discharge-rate & magnitude, and rate capabilities over a broad dynamic range –exploiting a method that mimics highly ionizing particles in the lab. In addition, we will report on recent studies of hole-avalanche distribution in THGEM structures using optical avalanche readout.

Presenter: BRESSLER, Shikma (Weizmann Institute of Science (IL))

Session Classification: Tuesday (MPGD morning session)

Contribution ID: **59** Type: **not specified**

Performance Studies of Bulk Micromegas with Different Amplification Gaps

Tuesday 2 July 2013 11:15 (25 minutes)

The bulk Micromegas detector is considered to be a promising candidate for building TPCs for several future experiments including the projected linear collider. The standard bulk with a spacing of 128 micron has already established itself as a good choice for its performances in terms of gas gain uniformity, energy and space point resolution and its capability to efficiently pave large readout surfaces with minimum dead zone. The present work aims to make a comparative study of the performance of this standard detector with other bulk Micromegas detectors having different amplification gaps. For this purpose four detectors with amplification gaps of 64, 128, 192 and 220 micron have been tested at room temperature and normal gas pressure. Different detector characteristics such as gain, energy resolution and electron transparency have been measured in various argon based gas mixtures to evaluate the effect of the variation of amplification gap on these parameters. In addition, preliminary measurements of ion backflow fraction of these detector have been carried out using an X-Ray tube that can deliver photons of different energy at a variable intensity. Further, in one of our recent works we have reported (vide VCI2013) the results of a numerical study to determine the effect of dielectric spacers on different detector features. In the present work we will like to report the results of a related study to estimate how these effects vary as the amplification gaps of the bulks change.

Presenter: COLAS, Paul (CEA/IRFU,Centre d'etude de Saclay Gif-sur-Yvette (FR))

Session Classification: Tuesday (MPGD mid-morning session)

Contribution ID: **60** Type: **not specified**

ACTAR-TPC: new active target for nuclear physics experiments

Tuesday 2 July 2013 11:40 (25 minutes)

Active target detection systems, where the gas used as the detection medium is also a target for nuclear reactions, have been used for a wide variety of nuclear physics experiments since the eighties. The improvement in MPGD (Micro Pattern Gaseous Detectors) and in micro-electronics achieved in the last decade permits the development of a new generation of active targets with higher granularity pad planes that allow spatial and time information to be determined with unprecedented accuracy. A novel active target and time projection chamber (ACTAR-TPC with 16k channels), that will be used to study reactions and decays of exotic nuclei at facilities such as SPIRAL2, is presently under development and will be based on MPGD technology. Several MPGD (Micromegas and Thick GEM) coupled to a 2×2 mm2 pixellated pad plane have been tested and their performances have been determined with different gases over a wide range of pressures. Of particular interest for nuclear physics experiments are the angular and energy resolutions. The angular resolution has been measured to be 1° FWHM for short traces of about 4 cm length and the energy reconstruction resolution deduced from the particle range was found to be better than 5% for 5.5 MeV particles. These experimental results could be compared to expected performances based on detailed GEANT4 simulations. These results have validated the use of MPGD for active-target applications and a demonstrator version of the ACTAR-TPC detection system with 2048 pixels in micromegas configuration is presently tested using GET (General Electronics for TPCs) front end cards.

Presenter: PANCIN, Julien (Grand Accelerateur National d'Ions Lourds (FR))

Session Classification: Tuesday (MPGD mid-morning session)

Contribution ID: **61** Type: **not specified**

High resolution tracking detectors with cascaded GEMs

Tuesday 2 July 2013 12:05 (25 minutes)

GEM-based position sensitive detectors are used and planned to be used in several experiments in the Budker INP. At present eight triple-GEM detectors are installed in the KEDR experiment at the VEPP-4M collider where they operate in the tagging system measuring momenta of electrons and positrons after two-photon interactions. Several triple-GEM detectors made of very light components are planned to be installed in the DEUTERON experiment at the VEPP-3 storage ring. The first detector of this type is assembled and tested with dedicated electronics. We plan also to build large cylindrical GEM-based detector with two layers of triple-GEMs of 60 cm inner diameter. This project is now discussed for the CMD-3 experiment at the VEPP-2000 collider. Status of all these projects will be described in the report.

Presenter: SHEKHTMAN, Lev (Budker Institute of Nuclear Physics (BINP))

Session Classification: Tuesday (MPGD mid-morning session)

Contribution ID: **62** Type: **not specified**

SuperFRS GEM-TPC Development for the FAIR Facility

Tuesday 2 July 2013 12:30 (25 minutes)

The FAIR facility is an international accelerator centre for research with ion and antiproton beams. It is being built at Darmstadt, Germany as an extension to the current GSI research institute. One major part of the facility will be the Super-FRS
separator. The NUSTAR experiments will benefit from the Super-FRS, which will deliver an unprecedented range of radioactive ion beams (RIB). These experiments will use beams of different energies and characteristics in three different branches; the high-energy which utilizes the RIB at relativistic energies 300-1500 MeV/u as created in the production process, the low-energy branch aims to use beams in the range of 0-150 MeV/u whereas the ring branch will cool and store beams in the NESR ring. The main tasks for the Super-FRS beam diagnostics chambers will be for the set up and adjustment of the separator as well as to provide tracking and event-by-event particle identification. The Helsinki Institute of Physics and the Comenius! University and the Detector Laboratory at GSI are in a joint R&D phase of a GEM-TPC detector which could satisfy the requirements of such diagnostics and tracking chambers in terms of tracking efficiency, space resolution and count rate capability. The current status of the prototype development, the results of test beam and simulations will be shown.

Presenter: GARCIA FUENTES, Francisco Ignacio (Helsinki Institute of Physics (FI))

Session Classification: Tuesday (MPGD mid-morning session)

Contribution ID: **63** Type: **not specified**

GEM based R&D for Muon Chambers for the CBM experiment at FAIR

Tuesday 2 July 2013 12:55 (25 minutes)

A large area, high rate, high granularity gas detector system is being developed for detection of muons in the Compressed Baryonic Experiment (CBM) at the upcoming FAIR facility in Germany. Consisting of alternating layers of detector-triplets and thick hadron absorbers, the main task of these Muon Chambers (MUCH) is to detect dimuons arising out of the decay of the low mass vector mesons and charmonia produced in the heavy ion collisions in CBM. A high event rate of about 10 MHz and a harsh radiation environment impose severe challenging constrains on the choice of detector technology for MUCH. For the first few detector stations, where the particle rates reach 1 MHz/sq.cm, a triple GEM gas detector with pad readout has been envisaged. Owing to this high event rate, a self triggered readout scheme has been adopted for all the detectors of the CBM experiment, where the data would be collected in a free streaming mode. This is a unique feature for all CBM detectors. Events are then reconstructed offline by grouping the hits on the detector on the basis of their timestamps. Several triple GEM prototypes with an active area of 100 sq. cm. with high granularity pad readout have been built at VECC, Kolkata and were successfully tested with proton, pion and muon beams, also using nXYTER, a self triggered ASIC. A charged particle detection efficiency higher than 90 % has been achieved from these tests. High rate test of the detectors have also been performed and the response of the detector studied. Large size triple GEM chambers based on sector geometry has been envisaged for the MUCH. Details on fabrication, assembly and test results of prototypes as well as issues related to actual layout of the MUCH chambers will be presented and discussed. Results from a large size GEM chamber with realistic pad granularity will also be presented.

Presenter: DUBEY, Anand Kumar (Department of Atomic Energy (IN))

Session Classification: Tuesday (MPGD mid-morning session)

Contribution ID: **64** Type: **not specified**

Review talk: fabrication techniques and industrialization of MPGDs

Tuesday 2 July 2013 14:50 (40 minutes)

Presenter: DE OLIVEIRA, Rui (CERN)

Session Classification: Tuesday (MPGD afternoon session)

Contribution ID: **65** Type: **not specified**

Status and progress of the novel photon detectors based on THGEM and hybrid MPGD architectures

Tuesday 2 July 2013 15:30 (25 minutes)

We are developing large size THick GEM (THGEM)-based detectors of single photons, mainly meant for Cherenkov imaging applications. The R&D programme includes the complete characterization of the THGEM electron multipliers, the study of the aspects related to the detection of single photons and the engineering towards large size detector prototype. Our most recent achievements include: dedicated studies concerning the ion backflow to the photocathode; relevant progress in the engineering aspects, in particular related to the production of large-size THGEMs, where the strict correlation between the local gain-value and the local thickness-value has been demonstrated and a 300 cm x 300 mm2 active area detector has been successfully operated at the CERN PS T10 test beam; the introduction of a new hybrid detector architecture offering promising indication, which is formed by a THGEM layer which acts as CsI support and pre-amplification device followed by a MICROMEGAS multiplication stage. We report about the general status of the R&D programme and, in detail, about the recent progress.

Presenter: TESSAROTTO, Fulvio (Universita e INFN (IT))

Session Classification: Tuesday (MPGD afternoon session)

Contribution ID: **66** Type: **not specified**

Submission test

Presenter: SAHIN, Ozkan (Uludag University)

Contribution ID: **67** Type: **not specified**

Development of Die Hard GEM using PTFE Insulator Substrate

Tuesday 2 July 2013 15:55 (25 minutes)

We have developed the GEM foils with polytetrafluoroethylene (PTFE) film as an insulator layer for the first time. Since the PTFE film is hard to be carbonized by arc discharge, the PTFE-GEM is expected to be strong against break down. We have experimentally nfirmed that the PTEF-GEM was really robust against discharge. The gain we achieved was larger than 2.6e+4 for 50 micron-thick PTEF-GEM in Ar/CO2=70%/30% gas mixture at the voltage between GEM electrodes Vgem=730 V. The PTFE-GEM foil was NEVER broken ven when it suffered more than 40 thousand discharges during the experiment. We think that PTFE is one of the excellent insulator material for GEM productions. At the conference, we will present the production procedure and the detail of our experiment for valuating the PTFE-GEM.

Presenter: TAMAGAWA, Toru (RIKEN)

Session Classification: Tuesday (MPGD afternoon session)

Contribution ID: **68** Type: **not specified**

A Piggyback resistive Micromegas

Tuesday 2 July 2013 16:20 (25 minutes)

Piggyback Micromegas consists in a novel readout architecture where the anode element is made of a resistive layer on a ceramic substrate. The resistive layer is deposited on the thin ceramic substrate by an industrial process which provides large dynamic range of resistivity (10ˆ6 to 10ˆ10 MΩ). The particularity of this new structure is that the active part is entirely dissociated from the read-out element. This gives a large flexibility on the design of the anode structure and the readout scheme. Without significant loss, signals are transmitted by capacitive coupling to the read-out pads. The detector provides high gas gain, good energy resolution and the resistive layer assures spark protection for the electronics. This assembly could be combined with modern pixel array electronic ASICs. First tests with different Piggyback detectors and configurations will be presented. This structure is adequate for cost effective fabrication and low out gazing detector. It was designed to perform in sealed mode and its long term stability has been extensively studied. In addition perspectives on the future developments will be evoked.

Presenter: FERRER RIBAS, esther

Session Classification: Tuesday (MPGD afternoon session)

Contribution ID: **69** Type: **not specified**

Micro Pixel Chamber with resistive electrodes for spark reduction

Tuesday 2 July 2013 17:05 (25 minutes)

The Micro Pixel Chamber (μ-PIC) using resistive electrodes have been developed and tested. The surface cathodes are made from resistive material, by which the electrical field is reduced when large current is flowed. Two-dimensional readouts are realized by oth anodes and pickup electrodes, on which signals are induced. High gas gain (>50000) was measured using 55Fe (5.9 keV) source, and very strong spark reduction was attained under fast neutron. The spark rate of resistive μ-PIC was only 1/10000 times less than that of normal μ-PIC in the gain of 10000. The planar MIP detector with no floating structure (such as wire, mesh or floating foil) is now realized by new μ-PIC with both high gain and good stability. In addition, using resistive cathodes, μ-PIC can be oprates by no HV applying on anodes. Neither AC coupling capacitors nor HV pull up resisters are needed for each anode electrode. Signal readout is drastically simplified by that configuration.

Presenter: Dr OCHI, Atsuhiko (Kobe University (JP))

Session Classification: Tuesday (MPGD evening session)

Contribution ID: **70** Type: **not specified**

The µdot-THCOBRA: a new gaseous electron multiplier concept

Tuesday 2 July 2013 17:30 (25 minutes)

A novel gas-avalanche patterned hole electron multiplier, based on the 2D-THCOBRA concept, is presented.

The microdot-THCOBRA (µdot-THCOBRA) presented in this work has active area of 10 × 10 cm2 and was specially designed for imaging purposes. It is a double-sided structure made out of a 0.4 mm thick G10 plate, covered with 50 µm of copper on both sides. Similarly to the 2D-THCOBRA, on the bottom side a pattern of strips is etched: a circular electrode surrounding each hole with 0.2 mm wide (cathode) and an anode strip about 0.2 mm wide. After the chemical etching of the Cu strips, the whole surface on the bottom side of the structure is covered with a DuPont Coverlay film. Then, part of the Coverlay layer is photochemically removed creating small dots around the holes which allow to concentrate more efficiently the electric field lines in that region, in order to increase the gain near the anode electrodes. The Coverlay layer is also removed from the cathode strips.
The top electrode of the structure is segmented in strips disposed orthogonally to the anode strips, in order to achieve the second dimension, for imaging purposes. Two orthogonal resistive lines connect the anode strips, and the top strips, respectively, for position sensitivity.
A study of the charge gain as a function of the voltage applied in the electrodes of the µdot-THCOBRA including gain stability and count rate capability will be presented, for different filling gases.

Presenter: VELOSO, joao (university of aveiro)

Session Classification: Tuesday (MPGD evening session)

Contribution ID: **71** Type: **not specified**

Performance of Glass GEM

Tuesday 2 July 2013 17:55 (25 minutes)

We report first concise review on Glass GEM. Our new GEM is fabricated in totally new process with photo-etchable glass. The glass is called PEG3, the photo-etchabale glass material manufactured by HOYA-PENTAX co. ltd. With this material, we succeed in fabricating a 400 to 840μm thick GEM with Cr and Cu layer electrodes. Glass GEM enables to overcome the drawbacks of conventional polyimide GEMs, such as non-uniformity, unrobustness and the outgas from the material. With this Glass GEM, we obtained 3*10ˆ4 gas gain with Ar/CH4 (90:10) gas, 5.9 keV (Fe-55) X-ray source. Photo-etchable glass is now commercially available from HOYA-PENTAX co. ltd. It has great characteristics for gaseous detector material such as conductivity, Young's modulus and Volume resistivity. High enough conductivity will be a great characteristic for avoiding charge ups in high intensity counting rate. Initial gain measurements indicated satisfactory stability with high intensity X-ray beam (6Mcps/mmˆ2) for 12 hours operation.

Presenter: FUJIWARA, Takeshi

Session Classification: Tuesday (MPGD evening session)

Contribution ID: **72** Type: **not specified**

Review talk: state-of-the-art in Microelectronics: Miniaturization and Integration

Wednesday 3 July 2013 09:00 (40 minutes)

Presenter: MARCHIORO, Alessandro (CERN)

Session Classification: Wednesday (MPGD morning session)

Contribution ID: **73** Type: **not specified**

The Pixel-TPC: first results from an 8-InGrid module

Wednesday 3 July 2013 09:40 (25 minutes)

Micromegas detectors have intrinsically a high granularity that is given by the distance between the holes in the mesh. To reflect this from the readout side an ASIC, the Timepix chip, with a pixel pitch of 55µm is used in our experiments. In the past a production process using photolithography was developed at the University of Twente on single chip basis. In this process the holes of the mesh are aligned with the pixels and an integrated grid is build on the chip (InGrid). To produce larger quantities of InGrids the process was transferred to a wafer based production at IZM Berlin. For evaluation, the InGrids were tested in our laboratory using a radioactive iron source. Gas amplification, response uniformity, energy resolution and single electron detection efficiency were investigated. Larger scale detectors with many pixel chips especially in a TPC environment require a new readout system. We have adapted the Scalable Readout System (SRS) to handle the Timepix chip. FPGA code as well as electronics are developed with the goal to construct at scalable system that can handle 96 chips. A board carrying eight InGrids was constructed and mounted on a module for the large prototype of the LCTPC collaboration at DESY. In a two week test beam at DESY in March and April we tested the new SRS based readout system together with the module. First results including data with magnetic field are presented.

Presenter: LUPBERGER, Michael (Universitaet Bonn (DE))

Session Classification: Wednesday (MPGD morning session)

Contribution ID: **74** Type: **not specified**

Properties of Thick-GEM in Low Pressure Deuterium

Wednesday 3 July 2013 10:05 (25 minutes)

Nuclear incompressibility is an important quantity in understanding the equation of state (EOS) of nuclear matter. To extract the nuclear incompressibility of neutron rich nuclei experimentally, one has to detect particles whose kinetic energies as low as a few hundred keV. For the purpose, CNS (Univ. of Tokyo), RIKEN and other universities have developed GEM-TPC based active target, CNS Active Target (CAT) for missing mass spectroscopy in inverse kinematics. If we choose deuterium as an active gas target, (d, d') reaction can be used. Basically, an active target has an outstanding benefit for a detection of very low energy particles. On the other hand, such particles runs within too short range in 1 atm gas target. For instance, 250 keV deuteron flies only 18 mm in 1 atm deuterium and it is insufficient to track the particle. Therefore, it is necessary to make the range of low energy particles longer to track precisely those particles. Usually, thick-GEM is used in a low-pressure condition, because thin GEM, such as standard CERN-GEM [1] hardly provides an enough gas gain in low pressure gas [2]. However, there were no references to investigate properties of thick-GEM in low-pressure deuterium. In this study, basic properties of 400μm-thick GEM in low-pressure deuterium were investigated. To have an enough gas gain, we have to employ multiple GEMs and we used double thick-GEMs. The achieved gas gain was around 1000. Not only electric field over pressure (E/p) dependence of gas gain but also electric fields of drift, transfer and induction region dependences were investigated. If the gas gain relies only on the E/p, there should be almost same gain in terms of E/p in various pressures for a constant ratio of electric fields. However, we found disagreements of gas gain at the same E/p value. This phenomenon could be explained by the effect of the "threshold"electric field where the multiplication starts. The gain stability was also measured and it showed about a ten-percent of sigma deviation. Those details will be presented in this talk. [1] F. Sauli, Nucl. Instr. And Meth. A 386 (1997) 531. [2] S.K. Das et al., Nucl. Instr. And Meth. A 625 (2011) 39.

Presenter: CHEONGSOO, Lee

Session Classification: Wednesday (MPGD morning session)

Contribution ID: **75** Type: **not specified**

Characterization of a medium-size Xe-TPC instrumented with microbulk-Micromegas

Wednesday 3 July 2013 10:30 (25 minutes)

Microbulk-Micromegas is a new generation of Micromegas (MICRO MEsh GAseous Structure) used for the detection and tracking of particles. Its simplicity, inherited from its constituent element –a double copper-clad kapton foil–, enhances its radiopurity, making it particularly well suited for rare event searches. The energy resolution is amongst the best obtained in mpgd architectures, with potential for an extremely fine level of segmentation, at the 100um scale or better. In particular, they have shown ability to cope with high pressure environments up to 10bar even when operated in pure Xenon. Within the R&D framework of the NEXT experiment, we have commissioned a medium-size 70-liter, 700cm2(readout) x 38cm(drift) TPC with an 0.8cm-pitch readout-segmentation (NEXT-MM). This constitutes the largest microbulk-instrumented system based on the largest single-piece wafers available to date. We will present a detailed characterization of this novel system as obtained under an optimized Xe-TMA mixture and various experimental conditions, stressing its strengths and weaknesses.

Presenter: GONZALEZ DIAZ, Diego (Universidad de Zaragoza (ES))

Session Classification: Wednesday (MPGD morning session)

Contribution ID: **76** Type: **not specified**

Property of LCP-GEM in Pure Dimethyl Ether under Low Pressure

Wednesday 3 July 2013 11:15 (25 minutes)

We have performed a systematic investigation of the gain properties of the GEM foil with copper-clad liquid crystal polymer insulator (LCP-GEM)[1], which will be applied to the photoelectric X-ray polarimeter using a TPC technique for NASA's sounding rocket experiment XACT. The pure dimethyl ether (DME) as TPC gas is slow drift velocity and small diffusion. We anticipate that the optimum DME pressure will lie in the 50-150 Torr range, tread detected count rate vs. modulation. However the LCP-GEM has not been operated under 190 Torr yet. To optimize DME pressure, we have measured the gain properties of 100 micron thick LCP-GEM in pure DME as a function of gas pressure; the pressure range of the measurement was from 10-190 Torr. We evaluated its gain by using collimated 6.4 keV X-rays from a generator. The gain at 190 Torr was > ˜ 20000 at the voltage between LCP-GEM electrodes Vgem=580 V, while that at 20 Torr was < 500 at Vgem= 490 V. The gain curves in the gain vs. Vgem coordinate seems quite complex behavior, although we found that the first Townsend coefficient as a function of E/P can be simply described by a function from E/P=200-2500 V/cm/Torr. The function was natural extension of the previous experiment done by A. Sharma et. al. at E/P < 50 V/cm/Torr [2]. Reference: [1]T. Tamagawa, et al., Nucl.Instr.Meth. A608 390 (2009) [2] A. Sharma et al., Nucl.Instr.Meth.A334,420 (1993)

Presenter: TAKEUCHI, Yoko

Session Classification: Wednesday (MPGD mid-morning session)

Contribution ID: **77** Type: **not specified**

Two-phase Cryogenic Avalanche Detectors in Ar with THGEM/GAPD-matrix optical readout

Wednesday 3 July 2013 11:40 (25 minutes)

Two-phase Cryogenic Avalanche Detectors (CRADs) with THGEM multipliers have become an emerging technique for rare-event experiments. In this work the performance of two-phase CRADs in Ar with THGEM/GAPD-matrix optical readout has for the first time demonstrated in terms of high spatial resolution and low detection threshold. Here the double-THGEM charge multiplier was combined with a 3x3 matrix of Geiger-mode APDs (GAPDs), optically recording THGEM-hole avalanches in the Near Infrared (NIR). The charge and light yields and the spatial resolution of such a combined THGEM/GAPD-matrix multiplier have been measured in the two-phase Ar CRAD. The effect of decreasing the GAPD rate capability at cryogenic temperature has been revealed in the course of the measurements. This effect was systematically studied and partially overcome by applying a dedicated peak-counting algorithm for GAPD signal processing. The applicability of such a technique to dark matter search and coherent n! eutrino-nucleus scattering experiments, in terms of providing ultimate (single-electron) sensitivity at higher (sub-cm) spatial resolution, is discussed.

Presenter: SOKOLOV, Andrey (Ecole Polytechnique)

Session Classification: Wednesday (MPGD mid-morning session)

Contribution ID: **78** Type: **not specified**

Micromegas as low background x-ray detectors for axion experiments

Wednesday 3 July 2013 12:05 (20 minutes)

Axion helioscopes aim at the detection of solar axions through their conversion into x-rays in laboratory magnetic fields. The use of low background and low energy threshold x-ray detectors is an essential component contributing to the sensitivity of these searches. Micromegas readouts operated in a Time Projection Chamber have demonstrated they can accomplish these goals. The possibility of reconstructing the event's track in three dimensions make them very competitive regarding discrimination capabilities. Additionally, microbulk type of Micromegas are intrinsically radiopure, imposing no significant limitations in background levels. In this work we present the low background techniques applied to Micromegas detectors in the context of the CAST experiment that has yielded to very remarkable background reductions over the years. The most recent Micromegas setups in CAST have achieved background levels 100 times lower than those obtained by the first generation of CAST d! etectors in 2002. We will also review the promising current developments in underground and surface facilities towards further improvements. Particularly, the best level currently achieved in a test setup operating in the Canfranc Underground Laboratory (LSC) is around 10ˆ-7 keVˆ{¯1}cmˆ{-2}sˆ{-1}, more than 10 times lower than best CAST results. These tests and detailed Monte Carlo simulations are leading to a deep understanding of the background origins, and the extracted strategies to mitigate it will be implemented in CAST for the next data taking campaigns. All this encourages the use of Micromegas readouts for IAXO, a new generation axion helioscope, that aims to improve CAST's sensitivity by more than one order of magnitude.

Presenter: GRACIA GARZA, Javier (Universidad de Zaragoza (ES))

Session Classification: Wednesday (MPGD mid-morning session)

Contribution ID: **79** Type: **not specified**

GEM-TPC X-ray Polarimeter onboard GEMS Satellite

Wednesday 3 July 2013 12:25 (25 minutes)

We have fabricated a semi-flight-ready micro GEM-TPC for the X-ray polarimeter telescope onboard the NASA's Gravity and Extremely Magnetism Small Explorer (GEMS) mission. The use of GEM-TPC in space is very different technical challenge from the uses in celerator based experiments. We carefully tested various issues to ensure two-years lifetime of the detector in orbit, including aging of the GEM foils and outgassing from detector materials. The GEM-TPC has 120 micron-pitch readout strips and can image a very short track (typically 1 mm) of photoelectrons emitted by photoelectric absorption of X-ray in pure dimethyl ether (DME) gas. At the conference, we will present the design and properties of the GEM-TPC, which will be launched into space very soon, and a ompactly fabricated readout system with APV25 ASIC chips.

Presenter: TAMAGAWA, Toru

Session Classification: Wednesday (MPGD mid-morning session)

Contribution ID: **80** Type: **not specified**

ASTROBOX: New detection for very low-energy protons spectra from β-delayed proton decay

Wednesday 3 July 2013 12:50 (20 minutes)

AstroBox, was developed to perform low energy proton spectroscopy from β-delayed proton emitters of interest to astrophysics studies: Energetic precursor nuclei are identified and stopped in the gas volume of the detector. The subsequent β or β-proton decay trace ionized paths in the gas. The ionization electrons are drifted in an electric field and are amplified by employing a Micro Pattern Gas Amplifier Detector, MPGAD. The system was tested in-beam using the β-delayed proton-emitter 23Al separated with the Momentum Achromat Recoil Spectrometer (MARS). Off-beam proton spectra have essentially no β background down to ˜150 keV and have a resolution of ˜15 keV (fwhm) for proton-decay lines at Ep=206 and 267 keV. Lines with βp-branching as low as 0.02% are observed. The device also gives good mass and charge resolution for energetic heavy ions measured in-beam. Results from the test experiment will be given.

Presenter: POLLACO, Emanuel

Session Classification: Wednesday (MPGD mid-morning session)

Contribution ID: **81** Type: **not specified**

Review talk: applications of MPGDs beyond particle and nuclear physics physics

Wednesday 3 July 2013 14:50 (40 minutes)

Presenter: MURTAS, Fabrizio (Istituto Nazionale Fisica Nucleare (IT))

Session Classification: Wednesday (MPGD afternoon session)

Contribution ID: **82** Type: **not specified**

TCPD, a TGEM Based Hybrid UV Photon Detector

Wednesday 3 July 2013 15:30 (25 minutes)

Micopattern technologies opened new horizons on gaseous photon detection. A well designed hybrid of a TGEM and an innovative multiwire structure can result in a RICH detector, operating in the UV regime, with the advantages of both technologies. Basic properties of the TCPD (ThickGEM+CCC Photon Detector) have been tested with beta and UV photon source, whereas its applicability as Cherenkov detector has been directly proven in particle beam tests. Simple construction relevant for large size detectors, high gain spark-free operaion, and natural MIP-signal suppression makes it competitive for RICH applications. The presentaion will focus on design, construction, and test beam results of this novel detector.

Presenter: HAMAR, Gergo (MTA KFKI RMKI)

Session Classification: Wednesday (MPGD afternoon session)

Contribution ID: **83** Type: **not specified**

Aging Effects in GEM Detectors

Wednesday 3 July 2013 15:55 (25 minutes)

The COMPASS experiment located at the SPS at CERN operates triple GEM track- ing detectors in an environment with very high radiation dose. Besides large GEM detectors near the beam line, also novel PixelGEM detectors characterized by a special pixel readout are used. These PixelGEM detectors are exposed to the muon- or hadron beam with energies of up to 200 GeV. Some of these detectors showed a reduced signal strength and therefore a reduced detector efficiency after four years of operation and the collection of a total charge of up to 15 mC/mm2 . Opening one of the affected detectors revealed colored deposits on the GEM foils and on the readout structure, matching exactly the regions of reduced gain. The investigation of GEM foils of an affected detector with an optical microscope, a scanning electron microscope (SEM) and an element analysis by energy dispersive x-ray spectroscopy (EDX) traced deposits of silicon and sulphur in the area with high beam intensity. The results of the investigation and possible origins of the depositions are presen- ted. Additionally, an experimental setup for long term measurements is shown to reproduce such aging effects in GEM detectors. Funded by BMBF, DFG Cluster of Excellence "Origin and Structure of the Uni- verse" (Exc 153) and Maier-Leibnitz-Labor of LMU and TUM. Authors: C. Dreisbach1 , A. Austregesilo1 , J. Durandi1 , F. Haas1 , M. Huber1 , B. Ketzer1 , I. Konorov1 , S. Paul1 , K. Rodewald2 , M. Tasior1 , S. Uhl1 —1 TU München, Physik De- partment E18, Garching bei München —2 TU München, Institut für Siliciumchemie, Garching bei München.

Presenter: DREISBACH, Christian

Session Classification: Wednesday (MPGD afternoon session)

Contribution ID: **84** Type: **not specified**

Status of THGEM based neutron detector in CSNS

Wednesday 3 July 2013 16:20 (25 minutes)

With the international development of the new generation neutron source, the traditional neutron detector can't satisfy the demand of the application of the high flux especially. And facing the global crisis of He-3 supply, the research on the
new style of the neutron detector becomes extremely urgent. Considered with the development demand of the domestic neutron scattering facility CSNS (China Spallation Neutron Source), this research proposes to develop the new style of neutron detector based on the boron convertor and the domestic THGEM with high flux capacity and two-dimensional position sensitivity. A prototype has been constructed. A thin boron coating on the cathode is used as the neuron convertor and a single THGEM (active area:50mm*50mm, thickness: 200μm, pin: 200μm, pitch:500μm) is employed for the gas multiplication. 64 channels x-y crossed strips (x:32 channels, y:32 channels, strip period 1.56mm) are arranged for 2-D signal readout. The electronics integrates a 64 channel ASIC based readout with FPGA by using x-y coincidence. The latest test results using the radiation source and X-ray machine are present, including the spectrum, counting rate, spatial resolution and the 2-D image. One of the key technologies is how to coat a thin boron film onto the electrode. Last year, boron coating has been successfully deposited onto the copper by using magnetron sputtering. The measurement results show the coating has high quality with firm adhesion, high purity and high speed of deposition.

Presenter: ZHOU, Jiangrong

Session Classification: Wednesday (MPGD afternoon session)

Contribution ID: **85** Type: **not specified**

Development of Cold- and Fast-Neutron THGEM Imaging Detectors for Investigation of Thermal-Hydraulic Phenomena

Wednesday 3 July 2013 17:55 (25 minutes)

We present our recent results on development of high-resolution instrumentation and measurement techniques for investigating various practical thermal-hydraulic processes, such as dynamic gas-liquid two-phase flow. Included in these activities, two projects are currently under development: -) A novel high-efficiency, one-dimensional fast-neutron imaging detector intended for fan-beam tomography applications. The detector consists of a multi-layer neutron-to-proton converter made of a hydrogenous polymer coupled to a position-sensitive THick Gaseous Electron Multiplier (THGEM) detector; the latter collects and multiplies the proton-induced electrons released in the gas gap between the converter foils, thereby localizing the neutron interaction. The design, operational principles, and performance of the new detector concept is discussed. In particular, we report on the characterization studies and results of electron transport along the small gas gaps of the converter, which affects the performance of the detector in terms of both detection efficiency and localization behavior. Measurements performed with a multi-foil converter and a 10x10 cm2 THGEM imaging detector prototype with monoenergetic 2.5 MeV and 14 MeV are presented and compared to Monte-Carlo simulat! ions. For irradiation with 2.5 MeV neutrons and a total of 300 converter foils, detection efficiencies of ˜7% and a spatial resolution of ˜1 mm are expected. -) A cold-neutron imaging detector prototype based on a THGEM. The detector consists of a thin Boron layer, for neutron-to-charged particle conversion, coupled to two THGEM electrodes in a cascad for charge amplification, and a position-sensitive charge-readout anode. The detector operates in Ne/(5%)CF4 at atmospheric pressure with a stable gain of around 104. Due to the geometrical structure of the detector elements (THGEM geometry and charge read-out anode), the image of the detector active area shows a large inhomogeneity, corrected using a dedicated flat-field correction algorithm. The prototype provides a detection efficiency of 5% and an effective spatial resolution on the order of 1.3 mm. Some possible applications include dynamic visualization of combustion engine fluid dynamics, non-destructive monitoring of capillary processes, investigation of heat exchange in fluidized-bed heat exchangers for the steel industry, or investigations of turbulent oil-gas flow through a pipe in petrochemical industry. Another class of important application includes the investigation of phenomena relevant for development of nuclear power plant technologies, such as gas-liquid or gas-solid two-phase flow, study of steam explosion processes, nuclear fuel inspection, and monitoring of special nuclear materials.

Presenter: CORTESI, Marco (Weizmann Institute of Science)

Session Classification: Wednesday (MPGD evening session)

Contribution ID: **86** Type: **not specified**

A Gaseous Compton Camera with MPGD-based readout

Wednesday 3 July 2013 18:20 (25 minutes)

A new Gaseous Compton Camera is under development. It consists on a High Pressure Gas Scintillation Proportional Counter being the light read-out by a gaseous photomultiplier. The photosensor is composed by a CsI photocathode deposited on the top electrode of a THGEM based structure with position capability and operating in a Ne/CH4 mixture at atmospheric pressure. Calculations and simulation studies were performed in order to optimize the gas/mixture in the scintillation chamber, envisaging medical applications. The Doppler-Broadening effect, the image quality and detector dead-time were studied for pure Ne, Ar, Xe and their mixtures at a pressure of 10 bar, when irradiates with 140 keV gamma photons. The detector was fully simulated including the primary charge and scintillation production, electron drift and electroluminescence amplification. Also, the VUV photon detection and solid angle viewed by the gaseous photomultiplier, were included. Firsts experimental studies, namely the primary scintillation and electroluminescence detection as function of the applied voltages and position and energy resolution will be presented. Acknowledgements: This work was partially supported by project CERN/FP/123597/2011and PTDC/FIS/1130937/2009 through COMPETE, FEDER and FCT (Lisbon) programs. A.L.M. Silva, L.F.N.D. Carramate are supported by a doctoral grant from FCT (Lisbon) with the respective references SFRH/BD/61862/2009 and SFRH/BD/71429/2010. C.D.R. Azevedo is supported by a Postdoctoral grant from FCT (Lisbon) with the reference SFRH/BPD/79163/2011.

Presenter: AZEVEDO, Carlos (University of Aveiro)

Session Classification: Wednesday (MPGD evening session)

Contribution ID: **87** Type: **not specified**

Review talk: MPGD Summary Talk

Wednesday 3 July 2013 18:45 (40 minutes)

Presenter: DALLA TORRE, Silvia (Universita e INFN (IT))

Session Classification: Wednesday (MPGD evening session)

Contribution ID: **88** Type: **not specified**

Study of Ion Back Flow suppression with thick COBRA GEM

Wednesday 3 July 2013 16:45 (1h 10m)

Ion Back Flow (IBF) suppression is essential for limiting the space-charge distortions in the upgraded ALICE TPC, where continuous readout is foreseen. GEM technology is one possible solution to achieve small IBF and to keep good performance in terms of particle tracking and particle identification at high rates. The development of readout chambers for the ALICE TPC with single mask GEMs is therefore our baseline approach, and the performance evaluation of IBF with GEMs under different configurations is being extensively investigated. In parallel with this development, we are investigating in Japan the potential of Thick COBRA GEMs as an alternative option. Cobra GEM foils features a double electrode pattern in one of its sides, which allows one to decouple the functions of electron amplification and ion blocking. By applying different voltages between these two electrodes, ions can be efficiently absorbed [1]. Our first measurement, performed on 3x3 cm2 foils, shows that IBF improves by a factor of 10 in a stack configuration consisting of one COBRA GEM together with two standard GEMs, compared to a triple standard GEM stack. The basic properties of the COBRA GEM and the optimization for IBF suppression are being studied through both measurement and simulation.
In this presentation, we will report on the crrent status of the R&D of Thick COBRA GEM. [1] J.F.C.A. Veloso et al., Nucl. Instr. and Meth. A639 (2011) 134-136.

Presenter: TERASAKI, Kohei (University of Tokyo (JP))

Session Classification: Wednesday (poster session)

Contribution ID: **89** Type: **not specified**

Development of the GEM-based Read-Out Chambers for ALICE TPC

Wednesday 3 July 2013 16:45 (1h 10m)

ALICE at the CERN-LHC is planning a major upgrade of the central barrel detectors to cope with an increase of the LHC luminosity in Pb-Pb after 2018. The goal is to record Pb-Pb interactions at a rate of 50-100 kHz after Long Shutdown 2 (LS2), which is a factor of about 100 more the current data acquisiton rate. For the Time Projection Chamber (TPC) this implies replacement of the existing MWPC-based readout chambers by continuously operated GEM detectors to overcome the rate limitations imposed by the present gated eadout scheme. A prototype of an ALICE Inner Read-Out Chamber (IROC) was equipped with three large-size GEM foils as amplification stage to demonstrate the feasibility of this solution. The GEM IROC was installed within a test field cage with a drift length of 115 mm and commissioned with radioactive sources. The dE/dx resolution of the prototype was evaluated in a test beam campaign at the CERN PS and is comparable to the resolution of the current (MWPC) IROC. Stability under LHC conditions was tested during ALICE p-Pb beamtime, when the prototype was mounted underneath LHC beam pipe, close to the interaction point. First results from these measurements will be discussed in this contribution. Further R&D of the GEM-IROC, including recent improvements in its design, will be presented as well as the status of building the OROC (Outer Read-Out Chamber) prototype for ALICE TPC. GEM-OROC will have 4 times larger active area, therefore 2 separate foils will have to be glued together to fit the required dimensions. Present ideas to provide a reliable mounting of the foils will be discussed.

Presenter: GASIK, Piotr Jan (Technische Universitaet Muenchen (DE))

Session Classification: Wednesday (poster session)

Contribution ID: **90** Type: **not specified**

Development of MicroMEGAS using sputtered resistive electrodes for ATLAS upgrade

Wednesday 3 July 2013 16:45 (1h 10m)

New MPGD production method, forming resistive electrodes by metal/carbon sputtering, has been developed. Both fine electrodes structure (<50 micron) forming and large area production (>1mˆ2) are available using this method. The surface resistivity is controlled within a few tens percent of uniformity in the range of 100kΩ/sq. −10MΩ/sq. Those properties are very useful for ATLAS MicroMEGAS production. We will report the development status and test results of prototype MicroMEGAS using sputtered resistive anodes for ATLAS muon upgrade.

Presenter: Dr OCHI, Atsuhiko (Kobe University (JP))

Session Classification: Wednesday (poster session)

Contribution ID: **91** Type: **not specified**

VUV sensitive gaseous photomultiplier with position capability based on thick multipliers

Wednesday 3 July 2013 16:45 (1h 10m)

A new VUV single-photon gaseous photomultiplier with position capability will be presented. It is based on a triple cascade of two THGEM followed by a 2D-THCOBRA with a CsI photocathode deposited on the top electrode of the first structure. To allow high gain at low voltage a mixture of Ne/CH4 at atmospheric pressure was used. The gas mixture also provide excellent photoeletron extraction from the CsI photocatothe as well as full electron collection efficiency. The photomultiplier uses a spectrosil B window to allow the etection of photons in the VUV range (> 165 nm). For the experimental studies a Ar(Hg) lamp to generate the single VUV photons was used. Gains above 10^6 were achieved at stable operation. The 2D-THCOBRA, in addition to an extra gain, also provides the position sensitivity through two orthogonal resistive lines connecting the electrodes strips in both sides of the structure. The image capability allows to "see"the shape of the first structure of the cascade from where the photoelectrons are emitted and focused into the oles. This indicate that position resolutions bellow 400 μm (FWHM) for single photons can be achieved with the proposed photomultiplier.

Presenter: VELOSO, joao (university of aveiro)

Session Classification: Wednesday (poster session)

Contribution ID: **92** Type: **not specified**

Large Area GEM for current and future experiments in Hall A at JLab

Wednesday 3 July 2013 16:45 (1h 10m)

The Super Big Bite Spectrometer (SBS) is Hall A firt new equipment in preparation for the 12 GeV upgrade of the CEBAF accelerator at Thomas Jefferson National Accelerator facility (JLab). University Of Virginia (UVa) is in charge of building of the GEM-based Polarimetry Back Tracker system for SBS. The Back Tracker is made of 8 large area (50 × 200 cm2) chambers. Each chamber is assembled using 4 triple GEM modules of with an active area of 50 × 50 cm2. In this talk, we present the construction and preliminary tests of SBS GEM prototype. We will also report on the ongoing studies of the performances of two apv25-based electronics systems that are going to be used for readout of the SBS GEM trackers. Finally we will present the R&D effort for large GEM for long term future projects like the Solenoid Large Intensity Device (SoLID) in Hall A at JLab and Electron Ion Collider (EIC).

Presenter: GNANVO, Kondo (University of Virginia (US))

Session Classification: Wednesday (poster session)

Contribution ID: **93** Type: **not specified**

A new glass GEM with a single sided guard-ring structure

Wednesday 3 July 2013 16:45 (1h 10m)

The GEM is widely used in variety of applications today, but its flexible structure requires careful handling. The GEM is also made of organic material, so it emits outgas. Therefore, we have developed a Glass GEM, whose substrate is made of Photosensitive Etching lass, PEG3 from HOYA Corporation. The conventional GEMs have a simple structure of thin foil with many tiny holes, but its tolerance to discharge is an issue. In addition, severe discharge may damage the front-end circuit, especially ASICs. Therefore spark tolerance solution is strongly required. As a new idea for suppressing discharge at high gain operation, we propose an asymmetric GEM which has a new guard-ring structure. A guard ring is formed surrounding each hole of Glass GEM. The main aim of guard rings is to reduce he capacitance, which is effective to restrict the total amount of charge in the discharge event. Although an additional guard-ring structure requires a higher applied voltage if we keep the same electric field inside the hole, the single sided guard rings can provide a sufficient gas gain with the suppression of the parallel capacitance to each hole. We have investigated the characteristics of guard ring Glass GEM with 6keV X-ray, and found that it provides a high gas gain up to 6,000 and high energy resolution around 16%. Discharge events are suppressed compared with the standard Glass GEM structure without guard rings.

Presenter: MITSUYA, Yuki

Session Classification: Wednesday (poster session)

Contribution ID: **94** Type: **not specified**

Charging-up studies: the case of GEM and THGEM

Wednesday 3 July 2013 16:45 (1h 10m)

Charging-Up of the insulator surfaces in MicroPatterned Gas Detectors (MPGDs) have been pointed as one of the responsible for the difference between experimental and Monte Carlo results. In this work an iterative method to simulate the charging-Up in Gas ectron Multiplier (GEM) and in the Thick-Gas Electron Multiplier (THGEM) is propose. The method consists on the simulation of the avalanches time evolution using a dynamical step that accelerates the simulation process. Comparison with experimental results hows that charging-up play an important role on the detectors operation, but should not be the only responsible for the difference between simulated and measured gain. In this work, simulated and experimental results for different GEM and THGEM onfigurations and for different applied voltages will be presented including a comparison between them.

Presenter: MENDES CORREIA, Pedro Manuel (University of Aveiro (PT))

Session Classification: Wednesday (poster session)

Contribution ID: **95** Type: **not specified**

Genetic multiplexing for MPGD: how to read more than 1,000 strips with 64 channels

Wednesday 3 July 2013 16:45 (1h 10m)

Modern particle physics experiments frequently require the detection of particles on large areas, with an excellent spatial resolution. The resulting detectors usually contain thousands of readout elements –strips, pixels, pads –and consequently the same number of electronic channels. In most cases, the electronics budget therefore becomes significant in the total cost of the project. It also leads to delicate issues on integration, cooling, power consumption, cabling, which can be prohibitive for some applications. Very often, however, the incident flux per readout element is not critical. For one particular event, the signal is localized on a few electronic channels, the others being useless. Even in high luminosity experiments, the spatial resolution is a stronger constraint for fine granularity in some parts of the acceptance. For this reason, the possibility to connect several readout elements to a single channel appears as a promising tool to optimize a given ! setup, providing that the resulting pattern allows the localization of a particle without ambiguities. In this presentation, I will describe a recent idea developed at the CEA-Saclay for MPGD detectors, called genetic multiplexing. Assuming a signal is deposited on at least 2 neighbouring strips, spatial resolution of the order of 100 microns can be achieved with meter size detectors equipped with only 64 channels. With this technique, the degree of multiplexing can be easily adjusted to the incident flux of particles to solve the ambiguities. This concept could be used in a wide range of applications, like particle physics, tomography, astrophysics, or homeland security. A 50x50 cm^2 Micromegas detector has been successfully tested with cosmics, and its performance will be presented.

Presenter: PROCUREUR, Sebastien (CEA/IRFU,Centre d'etude de Saclay Gif-sur-Yvette (FR))

Session Classification: Wednesday (poster session)

Contribution ID: **96** Type: **not specified**

Triple-GEM multi-module measurements in large TPC prototype

Wednesday 3 July 2013 16:45 (1h 10m)

A Time Projection Chamber (TPC) using micro-pattern gas detectors is planned as the tracking device for the next linear collider. A novel support structure for GEMs, which minimizes the material and improves the flatness of the foils, has been developed and tested with multiple GEM modules in a large TPC prototype at DESY. Reducing dead material at the GEM module boundaries improves the field homogeneity. In addition, a field shaping ring at the border of the module was installed to improve charge collection in regions with nonhomogeneous fields. A successful test beam campaign with 3 modules has been carried out. First results regarding resolution and field distortions will be presented.

Presenter: MUENNICH, Astrid (DESY)

Session Classification: Wednesday (poster session)

Contribution ID: **97** Type: **not specified**

Spatial Resolutions of GEM TPC - A Novel Theoretical Formula and Comparisons to Latest Beam Test Data

Wednesday 3 July 2013 16:45 (1h 10m)

Unprecedented charged particle momentum resolution is required for precision Higgs studies at the International Linear Collider (ILC), which in turn demands as many as 200 sampling points with a high spatial resolution of 100 microns or better if we are to adopt a TPC for the central tracker. We discuss a novel theoretical resolution formula for a GEM-readout TPC, which is applicable to inclined tracks as opposed to the previous formula which is valid only for normal incidence. The formula identifies key factors that determine the spatial resolution and helps optimize the readout pad geometry and H.V. settings for a given gas mixture. The formula is compared to the latest beam test results of the Asian GEM modules for the LC TPC Large prototype.

Presenter: YONAMINE, Ryo

Session Classification: Wednesday (poster session)

Contribution ID: **98** Type: **not specified**

Further studies on the position-sensitive THCOBRA for imaging purposes

Wednesday 3 July 2013 16:45 (1h 10m)

The THCOBRA [1] consists on a hybrid device combining characteristics of a THGEM and a MHSP in one single structure. The structure presents two multiplication stages allowing to reach the high gains needed to use resistive line readout methods. The 2D-THCOBRA structure used has an active area of about 10x10 cm2. The 2D-THCOBRA have shown a fair energy resolution capability of about 22% (FWHM) for 5.9 keV, and a charge gain above 104 in Ne/5%CH4 [2]. For 2D-imaging, two orthogonal resistive lines are located at the end of the electrodes in both sides of the structure for position sensitivity. The charge is collected in the edges of each resistive line and then the resulting four signals amplitude are digitized and processed to allow visualizing the resulting images. Also, from the amplitude of each pair of signals it is possible to determine the centroid of the electron avalanche distribution. Imaging capability of this device was recently studied and is described in reference [2]. Although, in that case, the position resolution was limited to about 2.5 mm due to the high photoelectron range in the present mixture (Ne/5%CH4). A recent study using a CsI photocathode and a 2D-THCOBRA structure [3], has achieved a spatial resolution below 0.4 mm for single photoelectron. A charge gain evaluation of the THCOBRA for different pure gases and gas mixtures more suitable for imaging purposes, as well as an evaluation on the count rate allowed by this device and a study of its stability for each of the filling gases used, will be presented together with its image capability.

Presenter: SILVA, Ana Luisa (University of Aveiro)

Session Classification: Wednesday (poster session)

Contribution ID: **99** Type: **not specified**

G2CD, General Gaseous Calorimeter Digitizer

Wednesday 3 July 2013 16:45 (1h 10m)

Digital sampling calorimeter with gaseous sensor layer can be used as Particle Flow Orientated calorimeter, since its homogeneous, robust and cost-efficient. The response of digital gaseous calorimeter can be characterized with efficiency and multiplicity. To validate the simulation tool and to enable further simulation-based analysis as well as data-MC comparison, we developed a general digitization method to reproduce efficiency and multiplicity using the spatial information simulated at higher granularity. This method can be applied to various types of gaseous detectors including GRPC and MicroMegas. Testing on test beam data, the experimental observables such as efficiency, multiplicity and number of hits at different thresholds have been reproduced to a high precision.

Presenter: HADDAD, Yacine (Ecole Polytechnique (FR))

Session Classification: Wednesday (poster session)

Contribution ID: **100** Type: **not specified**

Development of GEM for the CBM MUCH Detector

Wednesday 3 July 2013 16:45 (1h 10m)

In the GSI detector laboratory a test setup has been installed for the study of the characteristics of the Gas Electron Multiplier (GEM). GEMs will be used as trackers in the Muon Chamber in the future Compressed Baryonic Matter (CBM) experiment. The characteristics of triple GEM detectors have been studied systematically by using cosmic ray muons. The minimum ionizing particle (MIP) spectra has been taken for different GEM voltage setting. An efficiency plateau at 95% has been achieved for cosmic ray. At high rate operation of GEMs the value of the protection resistor influences the gain and the stability. We have investigated this feature varying both the rate and the value of the protection resistor. This measurement has been performed using both X-ray generator and Fe55 sources. The ageing and long-term stability of GEM based detectors has been studied employing both X-ray and Fe55 sources [1]. The ageing study of one GEM module is performed by using an 8 keV Cu X-ray generator to verify the stability and integrity of the GEM detectors over a longer period of time. The accumulated charge on the detector is calculated from the rate of the X-ray and the average gain of the detector. No sign of ageing is observed after accumulation of more that 0.04 mC/mm2. The details of the measurement and results will be presented. REFERENCES 1. S.Biswas et al., Nuclear Instruments and Methods in Physics Research A (In Press). DOI: 10.1016/ j.nima.2012.08.044.

Presenter: BISWAS, Saitkat (GSI - Helmholtzzentrum fur Schwerionenforschung GmbH (DE))

Session Classification: Wednesday (poster session)

Contribution ID: **101** Type: **not specified**

Solar space-born instruments and detectors for X-ray observations of the solar corona

Wednesday 3 July 2013 16:45 (1h 10m)

X-ray observations of the solar corona have been undertaken in Solar Physics Division of Space Research Centre of the Polish Academy of Sciences (SRC-PAS) in Wroclaw, Poland for more than four decades. A review of SRC-PAS satellite solar experiments and their measurements is shown with a particular focus on the latest ones. Various types of gaseous and solid state detectors used in space X-ray instrumentation are discussed. Possible applications of Micro Pattern Gaseous Detectors in further space experiments for solar X-ray observations are outlined.

Presenter: GBUREK, Szymon

Session Classification: Wednesday (poster session)

Contribution ID: **102** Type: **not specified**

Operation principles and requirements for electronics –detector system in solar X-ray instruments

Wednesday 3 July 2013 16:45 (1h 10m)

Requirements for detector –electronics system and its operation in solar X-ray experiments are discussed. Addressed are the issues related to readout method, thermal stability, radiation hardness, mechanical robustness, data acquisition and telemetry. Examples of solutions used in modern solar X-ray missions are shown. Discussion of the requirements for Micro Pattern Gaseous Detectors and electronics for solar X-rays observations is performed.

Presenter: GBUREK, Szymon

Session Classification: Wednesday (poster session)

Contribution ID: **103** Type: **not specified**

Quintuple-GEM CsI Ring Imaging Cherenkov Detector

Wednesday 3 July 2013 16:45 (1h 10m)

The next frontier in QCD research involves the construction of an Electron-Ion Collider (EIC), whose desired capabilities will include particle identification up to ˜ 60 GeV/c. Particle identification capabilities require a momentum spectrometer and a precision velocity measurement. Here, we achieve velocity resolution via a RICH detector by measuring the Cherenkov angle of the radiation, from which we derive particle velocity. This research presents performance capabilities of an R&D endeavor to develop a quintuple Gas Electron Multiplier (GEM) RICH detector, whose purpose is to resolve particle velocity at high momenta for future use in an EIC environment. The advantages of a GEM-based photon detector include its ability to operate well in the presence of strong magnetic fields, and additionally offers a low cost per unit area, in comparison with conventional photon detection technologies. We demonstrate detector performance via the detection of Cherenkov rings on a hexagonal array of readout pads, from which we obtain a coarse resolution measurement of ring radius. From this data we also calculate the number of photons per ring, applying a 3-sigma pulse height cut. Detector performance is also demonstrated under both forward and reverse-bias conditions at varied gain to demonstrate the plateau in photoelectron yield. The experimental results presented herein were performed at the newly established End Station Test Beam (ESTB) Facility at the Stanford Linear Accelerator Center (SLAC) in Menlo Park, CA, and demonstrates successful use of the facility by the inaugural group of outside users.

Presenter: ZAJAC, Stephanie

Session Classification: Wednesday (poster session)

Contribution ID: **105** Type: **not specified**

Triple-GEM detector: in direction of a Xe/Kr sealed X-ray imaging detector

Wednesday 3 July 2013 16:45 (1h 10m)

The main goal of this work is to study the performance of a triple GEM (Gas Electron Multiplier) detector, envisaging the development of high detection efficiency detectors for X-ray imaging applications. Preliminary studies were done using a triple GEM detector in a standard configuration filled with krypton and xenon at atmospheric pressure. First results shows a stable operation at high gains (>10 4) for both gases. The obtained gains are high enough to achieve good position resolutions when using different electronic readout systems for imaging purposes. Calculated and simulated studies of the detection efficiency and primary electron cloud size as a function of the x-ray energy in the range of 1-30 keV, will be presented for different noble gases and selected mixtures.Description of the sealed detector (low out-gassing materials) and of the purifying system will be given. Preliminary Imaging measurements with multichannel front end ASICs will be presented for Kr as a detection medium.

Presenter: CARRAMATE, L. F. N. D.

Session Classification: Wednesday (poster session)

Contribution ID: **106** Type: **not specified**

Advances of a new MPGD laboratory for training, development, fabrication, applications and innovation

Wednesday 3 July 2013 16:45 (1h 10m)

In this work we present the progress of the MPGD laboratory at the Universidad Antonio Nariño (UAN), Bogotá, Colombia. This is a new facility for research, development, training and new applications of MPGDs and related technologies. Along with the RD51-CERN, this laboratory is also supported by a new PhD program in applied science at the UAN. This is an effort of the UAN to continuo and extent its experience and contribution participating in the ATLAS experiment at CERN for the last five years and since 2009 as a member of the RD51 collaboration. The challenge of this new facility is to provide the infrastructure and organization for highly qualified training to an increasing number of technicians and professionals of different specialties for R&D, quality control, production, application and innovation related to MPGDs, and increasing the cooperation among RD51 members.

Presenter: GUTIERREZ, Rafael M (Universidad Antonio Nariño)

Session Classification: Wednesday (poster session)

Contribution ID: **107** Type: **not specified**

Development of an ATLAS compatible ReadOutDriver for MicroMegas Detectors, based on the SRS system

Wednesday 3 July 2013 16:45 (1h 10m)

High-rate capable micro-pattern gas detectors, as miromegas, are foreseen to replace the current detectors in the innermost foreward region of the ATLAS small wheel systems. In 2012, two micromegas prototype detectors have been installed inside the ATLAS myon spectrometer in front of a CSC detector. To read the data from these detectors together with the other ATLAS subsystems, a ReadOutDriver (ROD) based on the Virtex5 and Virtex6 FPGAs of the Scalable Readout System (SRS) has been developed. This system is highly scalable from a few hundered channels during detector development and test, up to the readout of a full sized detector subsystem. It integrates into the ATLAS readout chain and takes over tasks like trigger reception, data collection, slow control and eventbuilding, including trigger id, event id, bunchcrossing id and more. The structure of the ROD firmware is presented, together with first data from the system in the ATLAS environment.

Presenter: ZIBELL, Andre (Ludwig-Maximilians-Univ. Muenchen (DE))

Session Classification: Wednesday (poster session)

Contribution ID: **108** Type: **not specified**

Development of Au-coated THGEM for Single Photon, Charge Particle, and Neutron Detection

Wednesday 3 July 2013 16:45 (1h 10m)

We report the successful development of Au-coated THGEM totally based on homemade industrial PCB technology in China. The THGEMs with various dimensions and substrates had been made and tested. The production capability covers 500×1000 mm^2 sensitive area, hole diameter down to 200 um, thickness down to 150 um, rim from 10 to 120 um, different substrates, and mass production requirement. Some effective techniques had been applied to improve the quality and performance of the THGEMs. The effective gain, gain stability and uniformity, energy resolution in various gas mixtures were studied. The test results of X-ray, VUV\&UV light, cosmic ray, alpha particle show that this kind of THGEMs is promising.

Presenter: YUGUANG, Xie

Session Classification: Wednesday (poster session)

Contribution ID: **109** Type: **not specified**

Status of MM technology transfer to ELVIA

Friday 5 July 2013 17:30 (15 minutes)

Presenter: JEANNEAU, Fabien (CEA/IRFU,Centre d'etude de Saclay Gif-sur-Yvette (FR))

Session Classification: WG 6 - Production

Contribution ID: **110** Type: **not specified**

Production of high precision GEM foils in Korea

Friday 5 July 2013 17:45 (15 minutes)

Presenter: KIM, Hyunsoo (Chonbuk National University (KR))

Session Classification: WG 6 - Production

Contribution ID: **111** Type: **not specified**

Experience with large size Micromegas detectors produced by the CIREA-ELVIA company for the COMPASS experiment

Friday 5 July 2013 18:00 (15 minutes)

Author: NEYRET, Damien (CEA/IRFU,Centre d'etude de Saclay Gif-sur-Yvette (FR))

Presenter: NEYRET, Damien (CEA/IRFU,Centre d'etude de Saclay Gif-sur-Yvette (FR))

Session Classification: WG 6 - Production

Contribution ID: **112** Type: **not specified**

GEM NS2 movie

Presenter: MARINOV, Andrey (Ghent University (BE))

Contribution ID: **113** Type: **not specified**

Performance studies of Micromegas for the ATLAS experiment

Friday 5 July 2013 09:00 (20 minutes)

Presenter: IODICE, Mauro (INFN - Sezione di Roma Tre)

Session Classification: WG2 - Physics issues

Contribution ID: **114** Type: **not specified**

Triple-GEM multi-module measurements in large TPC prototype

Friday 5 July 2013 09:20 (20 minutes)

Presenter: MUENNICH, Astrid (D)

Session Classification: WG2 - Physics issues

Contribution ID: **115** Type: **not specified**

Study of Ion Back Flow suppression with thick COBRA GEM

Friday 5 July 2013 09:40 (20 minutes)

Presenter: TERASAKI, Kohei (University of Tokyo (JP))

Session Classification: WG2 - Physics issues

Contribution ID: **116** Type: **not specified**

Further studies on the position-sensitive THCOBRA for imaging purposes

Friday 5 July 2013 10:20 (20 minutes)

Presenter: SILVA, A.L.M.

Session Classification: WG2 - Physics issues

Contribution ID: **117** Type: **not specified**

VUV sensitive gaseous photomultiplier with position capability based on thick multipliers

Friday 5 July 2013 12:00 (20 minutes)

Presenters: LOPES, Tiago; VELOSO, joao (university of aveiro)

Session Classification: WG2 - Physics issues

Contribution ID: **118** Type: **not specified**

Development of Gas filled detector for High Energy Physics Experiment

Friday 5 July 2013 11:20 (20 minutes)

Presenter: BISWAS, Saikat (GSI)

Session Classification: WG2 - Physics issues

Contribution ID: **119** Type: **not specified**

The FIDIAS project: development of a Micromegas TPC for low energy heavy ions detection

Friday 5 July 2013 12:20 (20 minutes)

Presenter: IGUAZ GUTIERREZ, Francisco Jose (Universidad de Zaragoza (ES))

Session Classification: WG2 - Physics issues

Contribution ID: **120** Type: **not specified**

A novel TPC for the MINOS project

Friday 5 July 2013 11:40 (20 minutes)

Presenter: Dr PEYAUD, Alan (CEA/IRFU,Centre d'etude de Saclay Gif-sur-Yvette (FR))

Session Classification: WG2 - Physics issues

Contribution ID: **121** Type: **not specified**

A new glass GEM with a single sided guard-ring structure

Friday 5 July 2013 10:40 (20 minutes)

Presenter: MITSUYA, Yuki

Session Classification: WG2 - Physics issues

Contribution ID: **122** Type: **not specified**

New results on gas gain fluctuations in a Micromegas detector

Friday 5 July 2013 10:00 (20 minutes)

Presenter: Dr ZERGUERRAS, Thomas (Universite de Paris-Sud 11 (FR))

Session Classification: WG2 - Physics issues

Contribution ID: **123** Type: **not specified**

Genetic multiplexing for MPGD: how to read more than 1,000 strips with 64 channels

Presenter: PROCUREUR, Sebastien (CEA/IRFU,Centre d'etude de Saclay Gif-sur-Yvette (FR))

Contribution ID: **124** Type: **not specified**

G2CD, General Gaseous Calorimeter Digitizer

Saturday 6 July 2013 10:30 (20 minutes)

Presenter: HADDAD, Yacine (Ecole Polytechnique (FR))

Session Classification: WG4 - Simulation

Contribution ID: **125** Type: **not specified**

Proof of principle power pulsed electronics for Linear Collider TPC

Saturday 6 July 2013 09:20 (20 minutes)

Presenter: Dr DIXIT, Madhu Sudan (Carleton University (CA))

Session Classification: WG5 - Electronics

Contribution ID: **126** Type: **not specified**

Operation principles and requirements for electronics –detector system in solar X-ray instruments

Saturday 6 July 2013 09:40 (20 minutes)

Presenter: PODGORSKI, Piotr

Session Classification: WG5 - Electronics

Contribution ID: **127** Type: **not specified**

Upgrade of the TOTEM DAQ using the Scalable Readout System (SRS)

Saturday 6 July 2013 10:00 (20 minutes)

Presenter: QUINTO, Michele (Universita e INFN-Bari (IT))

Session Classification: WG5 - Electronics

Contribution ID: **128** Type: **not specified**

Update on the integration of SRS into the ATLAS DAQ environment

Saturday 6 July 2013 10:20 (20 minutes)

Presenter: ZIBELL, Andre (Ludwig-Maximilians-Univ. Muenchen (DE))

Session Classification: WG5 - Electronics

Contribution ID: **129** Type: **not specified**

SRS commercial status 2013

Saturday 6 July 2013 10:40 (20 minutes)

Presenter: MULLER, Hans (CERN)

Session Classification: WG5 - Electronics

Contribution ID: **130** Type: **not specified**

First observation of electroluminescence in liquid xenon within THGEM holes - towards novel Liquid-Hole Multipliers

Presenters: BRESKIN, Amos (Weizmann Institute of Science (IL)); BRESSLER, Shikma (Weizmann Institute of Science (IL))

Contribution ID: **131** Type: **not specified**

Development of Micromegas using sputtered resistive electrodes for ATLAS upgrade

Friday 5 July 2013 17:20 (10 minutes)

Presenter: Dr OCHI, Atsuhiko (Kobe University (JP))

Session Classification: WG1 - Technologies

Contribution ID: **132** Type: **not specified**

Genetic multiplexing for MPGD: how to read more than 1,000 strips with 64 channels

Friday 5 July 2013 12:40 (20 minutes)

Presenter: PROCUREUR, Sebastien (CEA/IRFU,Centre d'etude de Saclay Gif-sur-Yvette (FR))

Session Classification: WG2 - Physics issues