

16th RD50 Workshop (Barcelona)

Report of Contributions

Contribution ID: 0

Type: **Talk**

Cluster model in Si

Monday, 31 May 2010 11:20 (20 minutes)

The analysis of photoconductivity, free carrier mobility and free carrier concentration time dependence allows to propose the cluster model that involves the evaluation of a band structure around the cluster and the capture of both carriers. The density functional method was used for band structure simulation. Photoconductivity, Hall, magnetoresistance and Photo Hall effects dependence on temperature and time were exploited experimentally. It is found the Fermi level position plays main role in the activation of clusters as the recombination centers.

Primary author: Prof. VAITKUS, Juozas (Vilnius University)

Co-authors: Dr MEKYS, Algirdas (Vilnius University); Dr ŽAŠINAS, Ernestas (Vilnius university); Dr GAUBAS, Eugenijus (Vilnius University); Dr STORASTA, Jurgis (Vilnius University)

Presenter: Prof. VAITKUS, Juozas (Vilnius University)

Session Classification: Defect Characterization

Track Classification: Defect and Material Characterization and Engineering

Contribution ID: 1

Type: **Talk**

Impact Ionization in Silicon Detectors

Tuesday, 1 June 2010 09:40 (20 minutes)

Charge multiplication by impact ionisation is a well known effect in semiconductors. It is used for signal amplification in devices like APD (Avalanche photodiodes) and SiPMs (Silicon Photomultipliers). Such devices are developed and produced in the MPI Semiconductor lab. Based on this experience we can calculate and simulate impact ionisation effects in planar tracking detectors. The results will be compared with measurements.

Primary author: Dr MOSER, Hans-Guenther (MPI fuer Physik)

Co-authors: Dr MACCHIOLO, Anna (MPI für Physik); BEIMFORTE, Michael (MPI für Physik); RICHTER, Rainer (MPI für Physik)

Presenter: Dr MACCHIOLO, Anna (MPI für Physik)

Session Classification: Pad Detector Characterization

Track Classification: Pad Detector Characterization

Contribution ID: 2

Type: **Talk**

Forward-bias operation of FZ and MCZ silicon detectors made with different geometries in view of their applications as radiation monitoring sensors.

Tuesday, 1 June 2010 09:00 (20 minutes)

Aiming at evaluating new options for radiation monitoring sensors for LHC/SLHC experiments, the radiation responses of FZ and MCz silicon detectors of different geometry have been studied up to about 4×10^{14} neq/cm².

Primary author: Dr MEKKI, Julien (Universite Montpellier II)

Co-authors: Mr GLASER, Maurice (CERN); Dr MOLL, Michael (CERN)

Presenter: Dr MEKKI, Julien (Universite Montpellier II)

Session Classification: Pad Detector Characterization

Track Classification: Other topics

Contribution ID: 3

Type: **Talk**

Impact of bulk generation current on operation of floating guard rings in silicon segmented detectors

Tuesday, 1 June 2010 14:50 (20 minutes)

The physical model of voltage terminating structure with floating guards in silicon segmented detectors is developed. The model combines earlier investigation of potential distribution between the floating guard rings which are based on electrostatic approach, and supposed new approach of the generation current impact on the potential distribution between the rings. The new aspects are based on the recent experimental studies of potential distribution and intergap characteristics in Si segmented detectors elaborated for high energy physics experiments.

Primary author: VERBITSKAYA, Elena (Ioffe Physical-Technical Institute RAS)

Co-authors: SAFONOVA, Nadezda (Ioffe Physical-Technical Institute RAS, and St. Petersburg Electrotechnical University "LETI"); Dr EREMIN, Vladimir (Ioffe Physical-Technical Institute RAS)

Presenter: VERBITSKAYA, Elena (Ioffe Physical-Technical Institute RAS)

Session Classification: Full Detector Characterization

Track Classification: Other topics

Contribution ID: 4

Type: **Talk**

Full 3D Simulation of the New BNL 3D-Trench Electrode Detectors (ICDA)

Wednesday, 2 June 2010 09:50 (20 minutes)

Full 3-dimensional device simulations have been carried on the new BNL 3D-Trench electrode detectors (or Independent Coaxial Detector Array (ICDA)). The full 3D simulations confirmed the conclusions from previous 1D simulations: the electric field in the 3D-Trench electrode detectors is much more homogeneous and no saddle points in electric potential as compared to the standard 3D detectors with column electrodes; the full depletion voltage and electric field can be greatly reduced if the trench electrode is set and the junction electrode – in the case of coaxial arrangement, they can be even smaller than those in a 2D detector with a thickness the same as the electrode spacing in the 3D-Trench electrode detectors. Mask design has been completed, and the detector processing will soon be started.

Primary author: LI, Zheng (BNL)

Presenter: LI, Zheng (BNL)

Session Classification: New Structures

Contribution ID: 5

Type: **Talk**

High-resolution photoinduced transient spectroscopy of defect centers in epitaxial silicon irradiated with high proton fluences

Monday, 31 May 2010 12:00 (20 minutes)

High-resolution photoinduced transient spectroscopy (HRPITS) has been used to imaging defect structure of n-type epitaxial layers using as active layers of pad detectors irradiated with 24 GeV/c protons. The effect of increasing fluence from $1.0 \times 10^{16} \text{ cm}^{-2}$ to $1.7 \times 10^{16} \text{ cm}^{-2}$ on parameters and concentrations of radiation defect centers in standard and oxygenated epilayers has been studied. In the former, the predominant defect centers with the activation energies of 315 and 420 meV are proposed to be related to multivacancy-oxygen and self-interstitial-oxygen complexes, respectively. In the latter, the predominant defect center with the activation energy of 420 meV is found to be attributed to the divacancy $V_2 (-/0)$.

Primary author: KAMINSKI, Pawel (Institute of Electronic Materials Technology)

Co-authors: FRETWURST, Eckhart (University of Hamburg Institute of Experimental Physics); ZELAZKO, Jaroslaw (Institute of Electronic Materials Technology); KOZLOWSKI, Roman (Institute of Electronic Materials Technology)

Presenter: KAMINSKI, Pawel (Institute of Electronic Materials Technology)

Session Classification: Defect Characterization

Track Classification: Other topics

Contribution ID: 6

Type: **Talk**

Campaign to identify the future CMS sensor baseline

Tuesday, 1 June 2010 14:30 (20 minutes)

CMS ordered a large variety of wafers in different thicknesses and technologies at HPK. Thicknesses from 50 - 300um are explored on floatzone, magnetic Czochralski and EPI material. Wafers are all coming in p-in-n and n-in-p versions. Every wafer contains different structures to answer different questions, e.g. geometry, Lorentz angle, radiation tolerance, annealing behaviour.

Primary author: HARTMANN, Frank (KIT - IEKP)

Presenter: HARTMANN, Frank (KIT - IEKP)

Session Classification: Full Detector Characterization

Track Classification: Other topics

Contribution ID: 7

Type: **Talk**

Optimization of the priming procedure for Thermally Stimulated Currents with heavily irradiated silicon detectors

Monday, 31 May 2010 11:00 (20 minutes)

We report on the investigation of the radiation damage induced by neutron irradiation on both n- and p-type Magnetic Czochralski silicon pad detectors by the Thermally Stimulated Currents (TSC) technique. Detectors have been irradiated with fast neutrons in the range 1014-1016 n/cm². Priming conditions have been studied in detail in order to investigate the residual electric field due to frozen charged traps after the priming step and its influence on the TSC emission. Zero bias TSC measurements have also been performed as an additional tool to study the defects distribution and the residual electric field. The electric field distribution inside the sample and its effect on the TSC emission are qualitatively explained by a band diagrams description.

Primary authors: Dr MENNICHELLI, David (University of Florence, INFN); Prof. BRUZZI, Mara (University of Florence, INFN); Dr SCARINGELLA, Monica (University of Florence, INFN); Dr MORI, Riccardo (University of Florence, INFN)

Presenters: Prof. BRUZZI, Mara (University of Florence, INFN); Dr MORI, Riccardo (University of Florence, INFN)

Session Classification: Defect Characterization

Track Classification: Other topics

Contribution ID: 8

Type: **not specified**

Evaluation of fluence dependent variations of capacitance and generation current parameters by transient technique

Monday, 31 May 2010 11:40 (20 minutes)

Evaluation of fluence dependent variations of capacitance and generation current parameters by transient technique

E.Gaubas, T.Ceponis, A.Uleckas, S.Sakalauskas, and J.Vaitkus

A transient technique for barrier evaluation by linearly increased voltage (BELIV) is presented. Variations of current transients under reverse and forward LIV biased pad-detectors, irradiated by reactor neutrons with fluences in the range of 10^{12} - 10^{16} cm⁻², are analyzed. Correlations between the BELIV and impedance based C-V measurements are discussed.

Primary author: Dr GAUBAS, Eugenijus (Inst. of Applied Research Vilnius University)

Presenter: Dr GAUBAS, Eugenijus (Inst. of Applied Research Vilnius University)

Session Classification: Defect Characterization

Contribution ID: 9

Type: **Talk**

Study of dominant recombination defects by fluence dependent variations of carrier lifetimes and drift parameters in MCZ Si wafers and pad-detectors

Monday, 31 May 2010 12:20 (20 minutes)

Study of dominant recombination defects by fluence dependent variations of carrier lifetimes and drift parameters in MCZ Si wafers and pad-detectors

E.Gaubas, T.Ceponis, A.Uleckas, J.Vaitkus, E.Zasinas, and J.Raisanen

Fluence-dependent variations of carrier recombination and drift parameters, measured by microwave probed photoconductivity (MW-PCD), charge collection transients (ChCT) and TCT techniques during 8 MeV protons irradiation, are presented. Fluence-dependent recombination lifetime variations in neutron and proton irradiated Si material produced by different technologies (MCZ, sFZ, DOFZ) are compared. Parameters of carrier generation centres are also discussed. Models of extended clusters are involved to simulate the fluence-dependent carrier recombination characteristics obtained in the experiments.

Primary author: Dr GAUBAS, Eugenijus (Inst. of Appl. Res. (IMSAR)-Vilnius University)

Presenter: Dr GAUBAS, Eugenijus (Inst. of Appl. Res. (IMSAR)-Vilnius University)

Session Classification: Defect Characterization

Contribution ID: 10

Type: **Talk**

A CCE and TCT study on low resistivity MCz-n detectors

Tuesday, 1 June 2010 15:10 (20 minutes)

Both ministrips and pad detectors realized on MCz p-on-n low-resistivity substrate were characterized with CCE and TCT measurements, after neutron and proton irradiation, up to fluences of 8×10^{15} neq/cm². The TCT were performed with both red and infrared laser, allowing an estimation of the CCE of the detectors. Results will be presented, showing a good radiation hardness of this type of material

Primary author: PACIFICO, Nicola (CERN)

Presenter: PACIFICO, Nicola (CERN)

Session Classification: Full Detector Characterization

Contribution ID: 11

Type: **Talk**

Development of an EDGE-TCT setup at CERN

Tuesday, 1 June 2010 10:00 (20 minutes)

An EDGE-TCT characterization bench was set-up at CERN. The setup is in a fully operational state, and further developments are close to completion, which should allow the application of this technique to non-prepared structures.

Primary author: PACIFICO, Nicola (CERN)

Presenter: PACIFICO, Nicola (CERN)

Session Classification: Pad Detector Characterization

Contribution ID: 12

Type: **Talk**

Study on 50, 75 and 150um thick p-type Epitaxial silicon pad detectors irradiated with protons and neutrons

Tuesday, 1 June 2010 11:00 (20 minutes)

A study on p-type epitaxial silicon pad detectors with thicknesses 50 and 75 μm is performed after proton irradiation up to $2.88 \times 10^{15} \text{ p/cm}^2$.

Samples with thickness 150 μm are also studied, after proton and neutron irradiation up to $1.73 \times 10^{15} \text{ p/cm}^2$ and $1 \times 10^{15} \text{ n/cm}^2$ respectively.

Capacitance, leakage current and charge collected are measured as a function of biasing voltage. It is also used the transient current technique (TCT).

For proton irradiation, it is found that the variation of the effective space charge density with fluence depends less on thickness in p-type than in n-type.

TCT measurements allow to verify a space charge sign inversion from negative to positive when the material is irradiated with protons,

as well as to get an estimation of the trapping times for holes. For a thickness of 150 μm the charge collected doesn't drop down at low fluences as it does for n-type.

Primary author: Mr DEL CASTILLO SANCHEZ, Eduardo (Ministerio de Ciencia e Innovacion MICINN)

Co-authors: Dr FAHRER, Manuel (CERN); Dr MOLL, Michael (CERN); Mr PACIFICO, Nicola (CERN)

Presenter: Mr DEL CASTILLO SANCHEZ, Eduardo (Ministerio de Ciencia e Innovacion MICINN)

Session Classification: Pad Detector Characterization

Contribution ID: 13

Type: **Talk**

Characterization of 75 and 150 micron thin strip and pixel sensors produced at MPP-HLL

Tuesday, 1 June 2010 15:30 (20 minutes)

We will present the results of leakage-current and capacitance measurements of a MPP-HLL production of 75 and 150 micron thin n-in-p strip and pixel sensors before and after irradiation up to a fluence of 10^{16} n_eq. They exhibit low dark currents and depletion voltages and break through well after depletion. The results of CCE measurements performed with the ALIBAVA read-out system will be shown.

The layout of a second n-in-p pixel production, aimed to supply sensors for the ATLAS IBL qualification process, is also presented.

Primary author: WEIGELL, Philipp (Max-Planck-Institut für Physik)

Presenter: WEIGELL, Philipp (Max-Planck-Institut für Physik)

Session Classification: Full Detector Characterization

Contribution ID: 14

Type: **not specified**

Characterization of the n-in-p CiS pixel production

Tuesday, 1 June 2010 15:50 (20 minutes)

We present the results of the pre-irradiation characterization of the n-in-p pixel production, performed at CiS in the framework of the RD50 Collaboration, containing sensors designed both for the ATLAS and the CMS pixel upgrade R&D activities.

A comparison of the performance of the ATLAS pixel sensors with standard and reduced guard ring will be given. The tuning of the TCAD simulation, obtained with diode structures of this production will be shown. The quality and the effect of the post-processing needed for the creation of the Under Bump Metallization will be discussed.

Primary author: MACCHIOLO, Anna (Max-Planck-Institut fuer Physik-Unknown-Unknown)

Presenter: MACCHIOLO, Anna (Max-Planck-Institut fuer Physik-Unknown-Unknown)

Session Classification: Full Detector Characterization

Contribution ID: 15

Type: **Talk**

Annealing effects in irradiated HPK strip detectors measured with SCT128 chip

Tuesday, 1 June 2010 17:30 (20 minutes)

Charge collection properties were measured with SCT128 chip in Hamamatsu mini strip detectors irradiated with neutrons. Detectors were annealed at 60C. Measurements were made after several annealing steps up to total annealing time of 84 hours at 60C.

Primary author: MANDIC, Igor (University of Ljubljana)

Presenter: MANDIC, Igor (University of Ljubljana)

Session Classification: Full Detector Characterization

Track Classification: Full Detector Systems

Contribution ID: 16

Type: **Talk**

Photoresponse spectrum in differently irradiated and annealed Si

Monday, 31 May 2010 15:20 (20 minutes)

The experimental results of photoconductivity response spectra in different samples (irradiation and low temperature annealing) are summarized and a set of optical activation energies is determined. The photoresponse was measured by instantaneous excitation and by excitation by 40 fs pulse generated by the tunable laser. The photoconductivity origin is analyzed taking into account the deep levels in the clusters and in the bulk. The peculiarities of the persistent photoconductivity are discussed.

Primary author: Prof. VAITKUS, Juozas (Vilnius University)

Co-authors: Dr GAUBAS, Eugenijus (Vilnius University); Mr VAINORIUS, Neimantas (Vilnius University); Prof. KAZUKAUSKAS, Vaidotas (Vilnius University); Dr KALENDRA, Vidmantas (Vilnius University)

Presenter: Prof. VAITKUS, Juozas (Vilnius University)

Session Classification: Defect Characterization

Track Classification: Defect and Material Characterization and Engineering

Contribution ID: 17

Type: **Talk**

Test beam results of MCz-Si detectors

Tuesday, 1 June 2010 17:50 (20 minutes)

Several magnetic Czochralski silicon detectors (p+/n-/n+ and n+/p-/p+) irradiated to different fluences have been tested at CERN H2 beam line with the CMS Silicon Beam Telescope (SiBT). The results suggest that both p-type and n-type MCz-Si detectors are sufficiently radiation hard for the $R > 25$ cm regions of S-LHC tracker volumes.

Primary author: Dr LUUKKA, Panja-Riina (Helsinki Institute of Physics HIP)

Presenter: Dr LUUKKA, Panja-Riina (Helsinki Institute of Physics HIP)

Session Classification: Full Detector Characterization

Track Classification: Full Detector Systems

Contribution ID: **18**

Type: **Talk**

Alibava system upgrade

Tuesday, 1 June 2010 16:50 (20 minutes)

The Alibava system have been upgraded implementing new features to address different issues proposed by the users. These new features as well as the firmware and software changes carried out will be described in this talk.

Primary author: MARCO HERNANDEZ, Ricardo (Instituto de Fisica Corpuscular (IFIC)-Universitat de Valencia-U)

Presenter: MARCO HERNANDEZ, Ricardo (Instituto de Fisica Corpuscular (IFIC)-Universitat de Valencia-U)

Session Classification: Full Detector Characterization

Track Classification: Full Detector Systems

Contribution ID: **19**

Type: **Talk**

Proton Irradiation in Karlsruhe

Tuesday, 1 June 2010 09:20 (20 minutes)

This presentation will give an overview of the frequently used proton irradiation facility in Karlsruhe. The current infrastructure is described and recent calibrations discussed.

Primary author: DIERLAMM, Alexander (Inst. fuer Experimentelle Kernphysik, KIT)

Presenter: DIERLAMM, Alexander (Inst. fuer Experimentelle Kernphysik, KIT)

Session Classification: Pad Detector Characterization

Track Classification: Pad Detector Characterization

Contribution ID: 20

Type: **Talk**

Status of the n-in-n CiS pixel production

Tuesday, 1 June 2010 16:10 (20 minutes)

Within the framework of RD50 and the ATLAS Upgrade Planar Pixel Sensor R&D Project (PPS), n-in-n sensors have been produced on n-bulk 4" DOFZ and MCz wafers. The structures on the wafer are mainly dedicated to the investigation of charge amplification effects and of reduction options for inactive edges. The latter will be important for future pixel detectors at small radii such as the ATLAS insertable b-layer (IBL).

Besides different diodes and test structures with segmented implants, pixel sensors matching the current and future ATLAS FE chips (FE-I3 and FE-I4) have been manufactured with several options.

We will present the wafer layout and role of the different sensor options and characterization results before and after UBM application on wafer level. Results from singularized structures of the first 6 diced wafers will be shown both after standard dicing and partially after slim-edge dicing with only 100-200 um safety margin.

Finally, we will outline an irradiation plan for sensors and sensor-FE-chip-assemblies including mixed irradiations to emulate the fluence at intermediate radii for trackers at SLHC experiments.

Primary author: Mr RUMMLER, André (TU Dortmund)

Presenter: Mr RUMMLER, André (TU Dortmund)

Session Classification: Full Detector Characterization

Track Classification: Full Detector Systems

Contribution ID: 21

Type: **not specified**

Outlook on the 2010 n-in-n CiS pixel production on thinned silicon

Tuesday, 1 June 2010 17:10 (20 minutes)

Within the framework of the ATLAS Upgrade Planar Pixel Sensor R&D Project (PPS) and with additional input from RD50 members, a new production of n-in-n sensors is currently under way at CiS. The production is carried out on n-bulk 4" DOFZ wafers with thicknesses ranging from 250 μm down to 150 μm in 25 μm steps.

The wafer layout contains sensors adapted to the future ATLAS readout chip FE-I4 suitable for the ATLAS insertable b-layer (IBL).

Further structures (mainly FE-I3 compatible pixel sensors and pad detectors) on the wafer are dedicated in large part to the investigation of charge amplification effects in pixel sensor geometries and their dependence on electric field distributions due to the different bulk thickness and implant boundary configuration.

Another principal focus of the test structures on this wafer are studies of the guard ring system in order to minimize the non-active sensor area.

The presentation will give an overview of the wafer layout, the production time schedule and a tentative irradiation plan.

Primary author: Mr RUMMLER, André (TU Dortmund)

Presenter: Mr RUMMLER, André (TU Dortmund)

Session Classification: Full Detector Characterization

Track Classification: Full Detector Systems

Contribution ID: 22

Type: **Talk**

CCE and TCT measurements in Karlsruhe - System Commissioning

Tuesday, 1 June 2010 10:20 (20 minutes)

The Setup around the ALiBaVa system in Karlsruhe is presented. Operational parameters are discussed. First measurements and Analysis with an irradiated FZ mini strip sensor are shown. Simulations for the understanding of the ALiBaVa and TCT setup are in progress.

Primary author: EBER, Robert (Karlsruhe Institute of Technology)

Co-authors: DIERLAMM, A. (Karlsruhe Institute of Technology); FREY, M. (Karlsruhe Institute of Technology); STECK, P. (Karlsruhe Institute of Technology); BARVICH, T. (Karlsruhe Institute of Technology); PFISTER, Tanja (Karlsruhe Institute of Technology); MÜLLER, Th. (Karlsruhe Institute of Technology); WEILER, Th. (Karlsruhe Institute of Technology); DE BOER, W. (Karlsruhe Institute of Technology)

Presenter: EBER, Robert (Karlsruhe Institute of Technology)

Session Classification: Pad Detector Characterization

Track Classification: Pad Detector Characterization

Contribution ID: 23

Type: **Talk**

Charge Collection and Space Charge Distribution in Neutron-Irradiated Epitaxial Silicon Detectors

Tuesday, 1 June 2010 11:20 (20 minutes)

Type inverted epitaxial n-type silicon diodes with a thickness of 100 μm and 150 μm and fluences between $1\text{E}14\text{ cm}^{-2}$ and $4\text{E}15\text{ cm}^{-2}$ were investigated using the transient current technique (TCT) at temperatures between $-40\text{ }^\circ\text{C}$ and $+20\text{ }^\circ\text{C}$.

A simulation of charge collection could be used to determine the field dependent trapping time and the space charge distribution in the detector bulk. Assuming a linear field dependence of the trapping times and a linear space charge distribution the data could be described.

Primary author: PÖHLSSEN, Thomas (University of Hamburg)

Co-authors: FRETWURST, Eckhart (University of Hamburg); BECKER, Julian (University of Hamburg); LANGE, Jörn (University of Hamburg); KLANNER, Robert (University of Hamburg)

Presenter: PÖHLSSEN, Thomas (University of Hamburg)

Session Classification: Pad Detector Characterization

Track Classification: Pad Detector Characterization

Contribution ID: 24

Type: **not specified**

Charge Multiplication in Highly-Irradiated Epitaxial Silicon Diodes

Tuesday, 1 June 2010 11:40 (20 minutes)

Charge collection efficiency (CCE) was measured in highly proton-irradiated 75, 100 and 150 μm thick n-type epitaxial silicon diodes of ST and DO material using the transient current technique (TCT) with 670 nm laser light. The dependence of charge multiplication on material, thickness, annealing time and temperature was studied at an equivalent fluence of $1\text{e}16$ $1/\text{cm}^2$. Furthermore, measurements of absolute collected charge were performed using a Sr90 beta-source and a charge-sensitive amplifier with 25 ns shaping time. Also in this case charge multiplication was observed. However, also the noise increases strongly at high voltages so that the signal-to-noise ratio decreases again after a maximum at moderate voltages.

Primary author: LANGE, Jörn (University of Hamburg)

Co-authors: FRETWURST, Eckhart (University of Hamburg); KRAMBERGER, Gregor (Jožef Stefan Institute); LINDSTRÖM, Gunnar (University of Hamburg); MANDIĆ, Igor (Jožef Stefan Institute); BECKER, Julian (University of Hamburg); KLANNER, Robert (University of Hamburg)

Presenter: LANGE, Jörn (University of Hamburg)

Session Classification: Pad Detector Characterization

Track Classification: Pad Detector Characterization

Contribution ID: 25

Type: **not specified**

Detailed studies on the E4/E5-defect as main current generator

Monday, 31 May 2010 15:00 (20 minutes)

This work focuses on the E5-defect which is known to be the main current generator after hadron irradiation. Two aspects were studied, on the one hand the assignment of the defect level with V3. We show a correlation between the annealing behaviour of E5 and the generation of L-defect, supporting the idea that E5 is V3 and L-defect is V3O. Additionally we compare the result to the transformation of V2 to X-defect.

On the other hand, we compare the recovery of the E5-defect concentration after applying 1A forward current with the recovery of the leakage current. As a result we want to discuss the role of the disordered region in the current generation process and the impact of E5.

Primary author: JUNKES, alexandra (Hamburg University)

Co-authors: Mr FRETWURST, Eckhart (Hamburg University); Mr LINDSTRÖM, Gunnar (Hamburg University); Mrs PINTILIE, Ioana (NIMP, Bucharest Margurele)

Presenter: JUNKES, alexandra (Hamburg University)

Session Classification: Defect Characterization

Contribution ID: 26

Type: **not specified**

Charge collection measurements on irradiated planar silicon strip sensors

Tuesday, 1 June 2010 18:10 (20 minutes)

The charge collection properties of different planar silicon strip sensors were measured after proton irradiation of doses up to 5×10^{15} neq/cm². The measurements were performed with a beta source by using the ALiBaVa readout system. The sensors were produced by HPK (ATLAS07 series) and CiS. Furthermore 75 μm thick epitaxial sensors produced by CiS in cooperation with MPI Munich were tested.

In this talk results of the charge collection measurements are presented, together with noise occupancy studies.

Primary authors: WALZ, Michel (Freiburg University); PARZEFALL, Ulrich (Freiburg University)

Presenter: WALZ, Michel (Freiburg University)

Session Classification: Full Detector Characterization

Track Classification: Full Detector Systems

Contribution ID: 27

Type: **not specified**

Summary report of the WODEAN meeting at Bucharest, 13-14 May 2010

Monday, 31 May 2010 14:30 (30 minutes)

The WODEAN meeting was hosted by the National Institute of Materials Physics NIMP at Bucharest. During the two days workshop the program was subdivided into 3 sessions with 19 talks in total. The first session was devoted to recent results about the “Impact of defects on radiation tolerance”, the second one to “Defect analysis by various methods” and the third one to “Modeling”. Some selected examples will be presented and discussed.

Primary author: Mr FRETWURST, Eckhart (Hamburg University)

Presenter: Mr FRETWURST, Eckhart (Hamburg University)

Session Classification: Defect Characterization

Track Classification: Defect and Material Characterization and Engineering

Contribution ID: 28

Type: **not specified**

Modeling of 3D silicon detectors

Wednesday, 2 June 2010 09:30 (20 minutes)

The transient response of 3D detectors has been modeled using TCAD. Experimental results (test-beam and in laser experiments) show a negative peak observed from a neighbouring pixel to the pixel in which the mip passes. This response is shown and explained. The simulation is performed for CNM double sided devices and full 3d detectors. The simulation will be extended to understand the response of the detector after irradiation with a plan to understand charge multiplication.

Primary author: Dr BATES, Richard (Department of Physics and Astronomy)

Co-author: Dr PELLEGRINI, Giulio (CNM)

Presenter: Dr BATES, Richard (Department of Physics and Astronomy)

Session Classification: New Structures

Track Classification: New Structures

Contribution ID: 29

Type: **not specified**

New 2D position sensitive detectors

Wednesday, 2 June 2010 10:10 (20 minutes)

We propose a new 2D silicon detector based on a common one-side microstrip detector with each strip covered by a resistive material layer in order to provide position information in the strip length direction. The first prototypes have been fabricated in the IMB-CNM clean room facilities. Simulations and electrical characterization results will be presented.

Primary author: Ms BASSIGNANA, Daniela (IMB-CNM CSIC)

Co-authors: Dr PELLEGRINI, Giulio (IMB-CNM CSIC); Dr VILA, Iván (IFCA); Dr LOZANO, Manuel (IMB-CNM CSIC); Dr FERNANDEZ, Marcos (IFCA)

Presenter: Ms BASSIGNANA, Daniela (IMB-CNM CSIC)

Session Classification: New Structures

Track Classification: New Structures

Contribution ID: 30

Type: **not specified**

Test Beam and Laser Measurements of Irradiated 3D Silicon Strip Detectors

Wednesday, 2 June 2010 10:30 (20 minutes)

This talk presents measurements of irradiated double-sided 3D silicon strip detectors. The devices under test were irradiated at the proton cyclotron in Karlsruhe with fluences expected for the sLHC strip and pixel layers. Results of measurements performed in a test beam with high energy pions and with an infrared laser are presented. Charge multiplication, which leads to a significantly increased signal of the irradiated detectors, is further investigated and implications on noise and space-resolved signal are studied.

Primary author: KOEHLER, Michael (Freiburg University)

Presenter: KOEHLER, Michael (Freiburg University)

Session Classification: New Structures

Track Classification: New Structures

Contribution ID: **31**

Type: **not specified**

discussion on Defect Characterization

Monday, 31 May 2010 15:40 (30 minutes)

Presenter: FRETWURST, Eckhart

Session Classification: Defect Characterization

Contribution ID: 32

Type: **not specified**

discussion on Pad Detector Characterization

Tuesday, 1 June 2010 12:20 (40 minutes)

Presenter: KRAMBERGER, gregor

Session Classification: Pad Detector Characterization

Contribution ID: 33

Type: **not specified**

discussion on New Structures

Wednesday, 2 June 2010 11:50 (40 minutes)

Presenter: BATES, Richard

Session Classification: New Structures

Contribution ID: 34

Type: **not specified**

discussion on Full Detector Characterization and current projects

Tuesday, 1 June 2010 18:30 (30 minutes)

Primary author: CASSE, Gianluigi

Presenter: CASSE, Gianluigi

Session Classification: Full Detector Characterization

Contribution ID: 35

Type: **Talk**

3D detector activities at CNM-IMB

Wednesday, 2 June 2010 11:10 (20 minutes)

Presenter: FLETA, Celeste

Session Classification: New Structures

Track Classification: New Structures

Contribution ID: 36

Type: **not specified**

Preliminary results from 3D CMS pixel detectors

Wednesday, 2 June 2010 11:30 (20 minutes)

Two different 3D detector designs with CMS pixel readout electronics are being developed and evaluated for their advantages and drawbacks. The fabrication of full-3D active edge CMS pixel detectors with p-type substrate has been successfully completed at SINTEF. Electrical characteristics and preliminary beam test results of these devices will be presented.

Primary author: Mr KOYBASI, Ozhan (Purdue University)

Presenter: Mr KOYBASI, Ozhan (Purdue University)

Session Classification: New Structures

Track Classification: New Structures

Contribution ID: 37

Type: **not specified**

Metal Contacts to High Resistivity Semiconductors

Tuesday, 1 June 2010 12:00 (20 minutes)

Contacts are often key components in high resistivity devices. Many textbooks describe in details Schottky and Ohmic contacts, however the discussion is usually limited to contact on low resistivity semiconductors. Such textbook case would imply the use of depletion approximation, etc. Even numerous scientific publication discussing contacts on wide band-gap, high resistivity semiconductor, such as CdTe and CdZnTe, utilize the simplified textbook description. It is shown that the use of such approximations is not suitable for high resistivity material, and that rough hand calculations may not be satisfactory.

This study used ISE-TCAD computer simulation to describe the current conduction and the electric field distribution in high-resistivity CdTe Metal-Semiconductor-Metal (MSM) structure under bias. It is shown that even in the case of small Schottky barrier the current may be dominated by minority carriers, and that the textbook approximation is totally inappropriate.

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Session Classification: Pad Detector Characterization

Track Classification: Pad Detector Characterization

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Welcome

Monday, 31 May 2010 10:30 (20 minutes)

Primary author: Dr LOZANO, Manuel

Presenter: Dr LOZANO, Manuel

Session Classification: Welcome