Olga Novgorodova

Previously:

Diploma, Moscow Physic Engineering Institute (MEPHI, Moscow, Russia)

Diploma - Registration of very high energy atmospheric showers by silicon photomultipliers

Now:

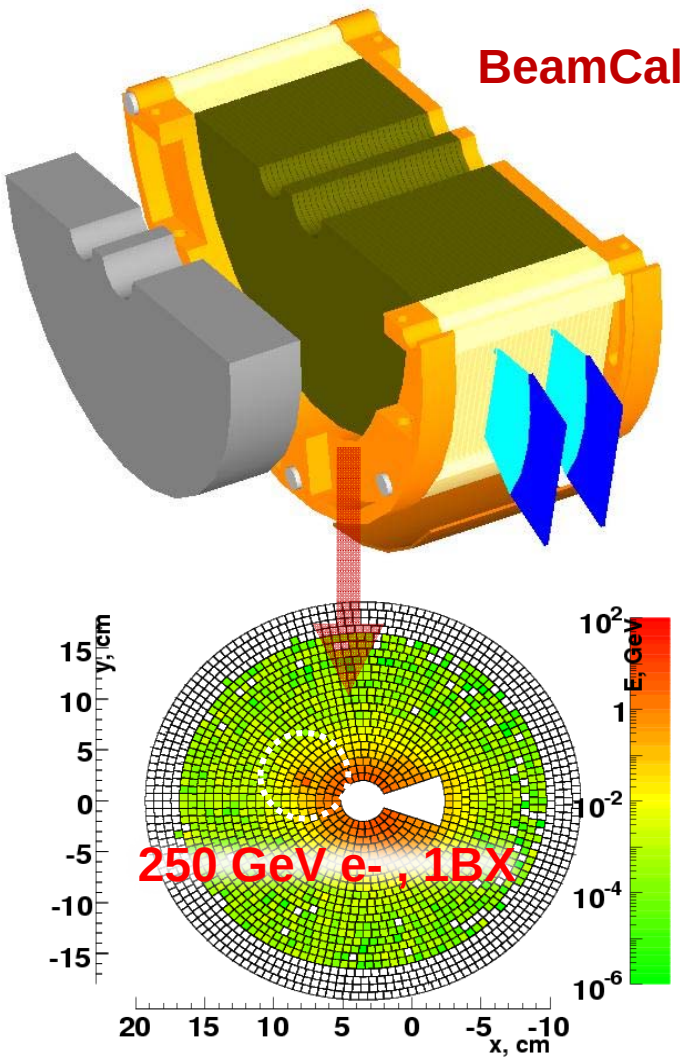
ESR, contract started July 2009

DESY, Germany

Very Forward Calorimetry (P6)

W. Lohmann, BTU Cottbus

Introduction



Segmentation of sensor layer

For the Future Linear Colliders Detectors:

- Around Beam-pipe
- 30 Layers
- Tungsten absorber:
- Sensor layer
- Radii 2….15cm, depth ~12 cm
- Sensor segmentation 8x8 mm^2

Planned:

-GEANT4 based simulation tools BeCaS and MOKKA

-Laboratory and test-beam tests

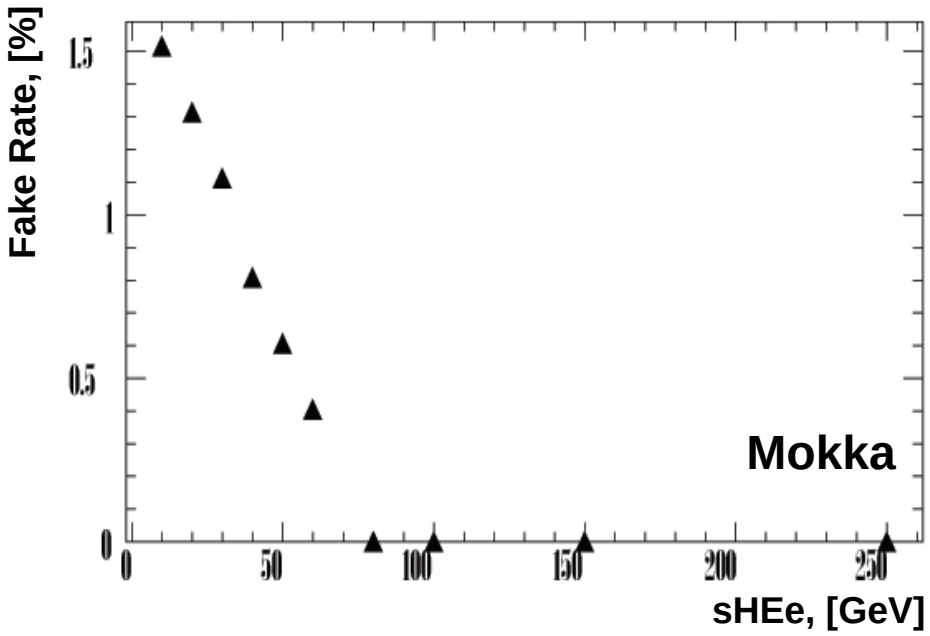
- The readout of this plane with an appropriate FE ASIC

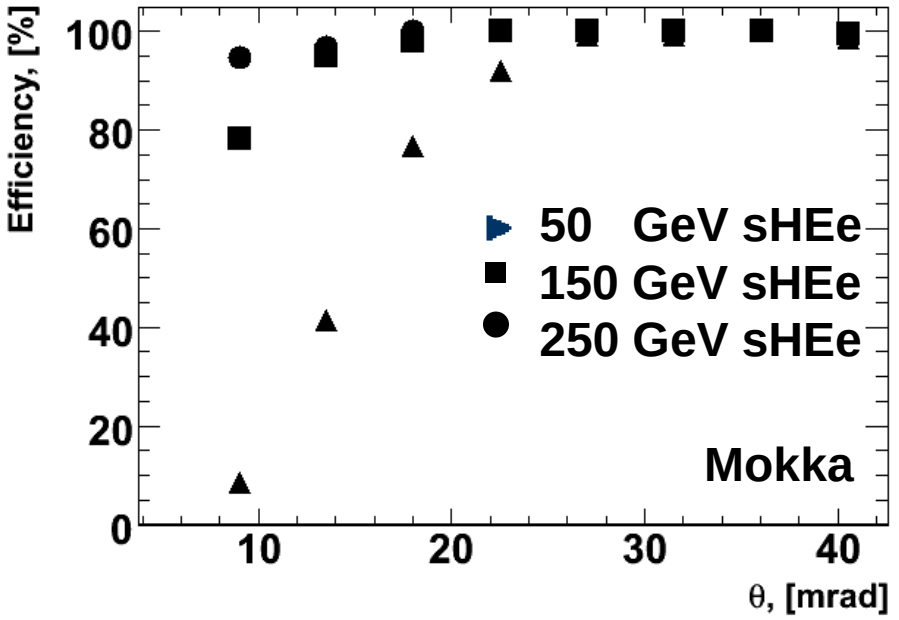
-The final goal - detailed performance study of the fully equipped sensor plane in a test beam at DESY

Electron Reconstruction

Algorithm of cluster reconstruction was implemented:

sHEe on top of BX is searched in respect to average of 10 BX





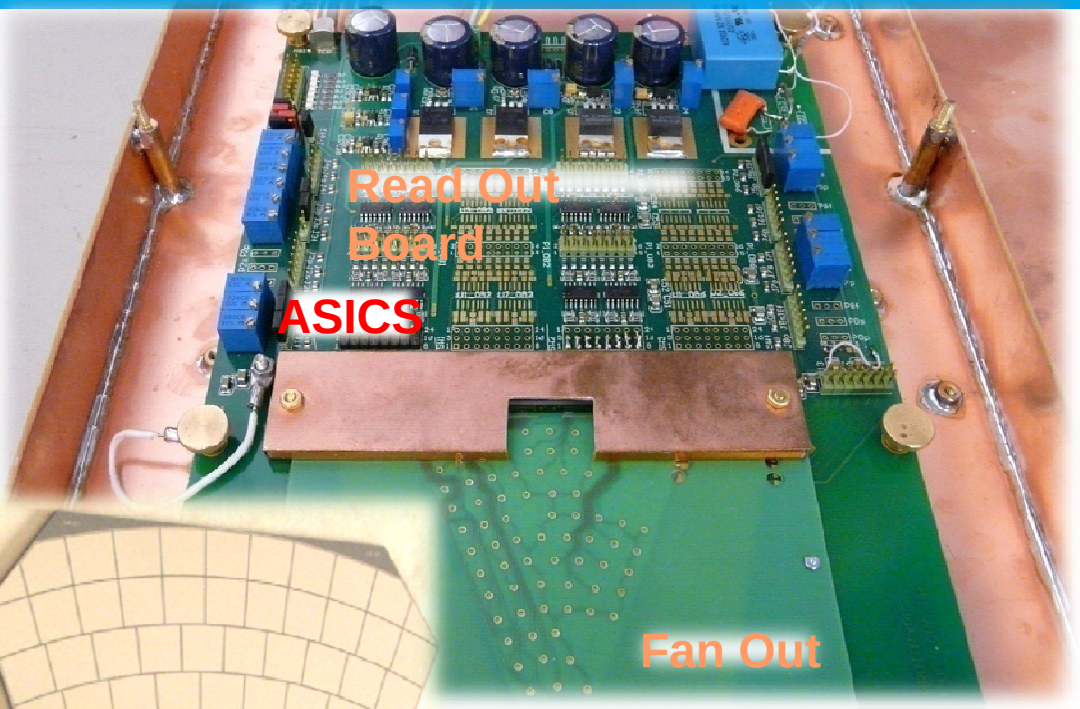
Fake Rate calculated for 1000 bunch crossings with applying an reconstruction algorithm for sHEe

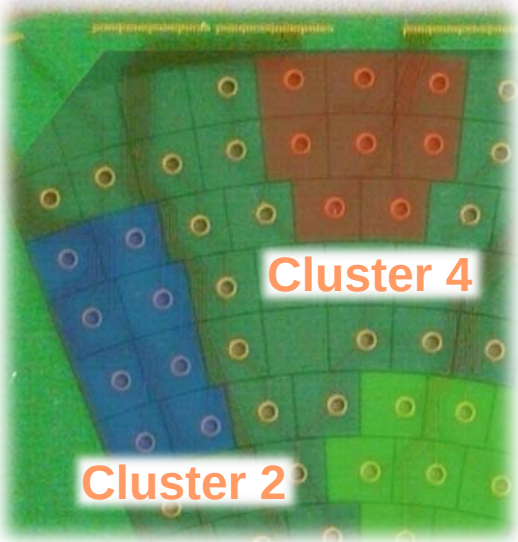
Reconstruction efficiency as a function of Radius (start from beam-pipe) for 50, 150, 250 GeV sHEe with nominal beam parameters

sHEe - single high energy particle

Mokka - GEANT4 based full Monte Carlo for an ILC large detector

First Prototype for GaAs





GaAs Prototype with readout electronics were developed and tested in the laboratory and the test beam at DESY-Hamburg

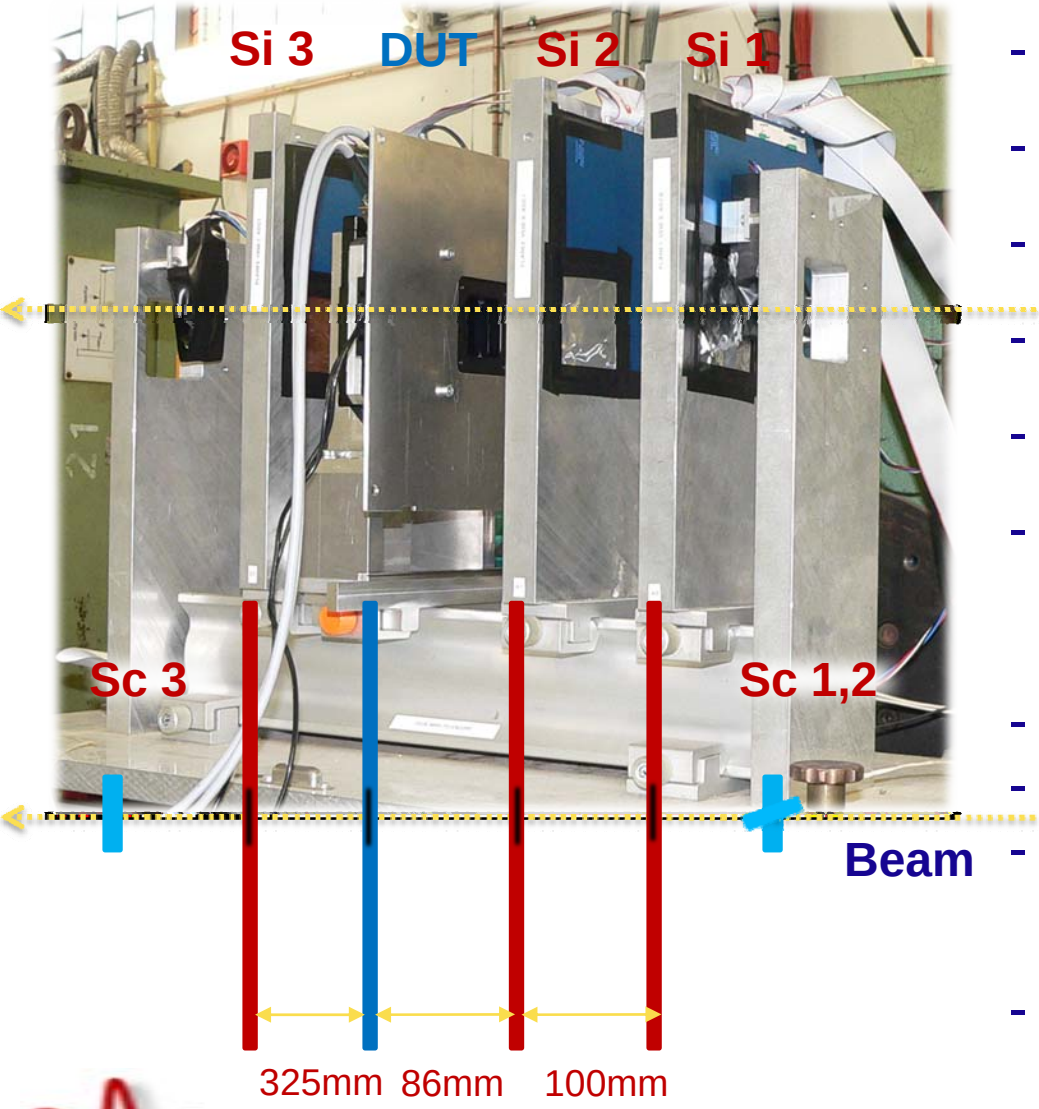
Laboratory Measurements:

-IV, CV measurements of GaAs sensor plate

-Linearity tests

- Source measurements for pads tests

Test Beam Setup, DESY II

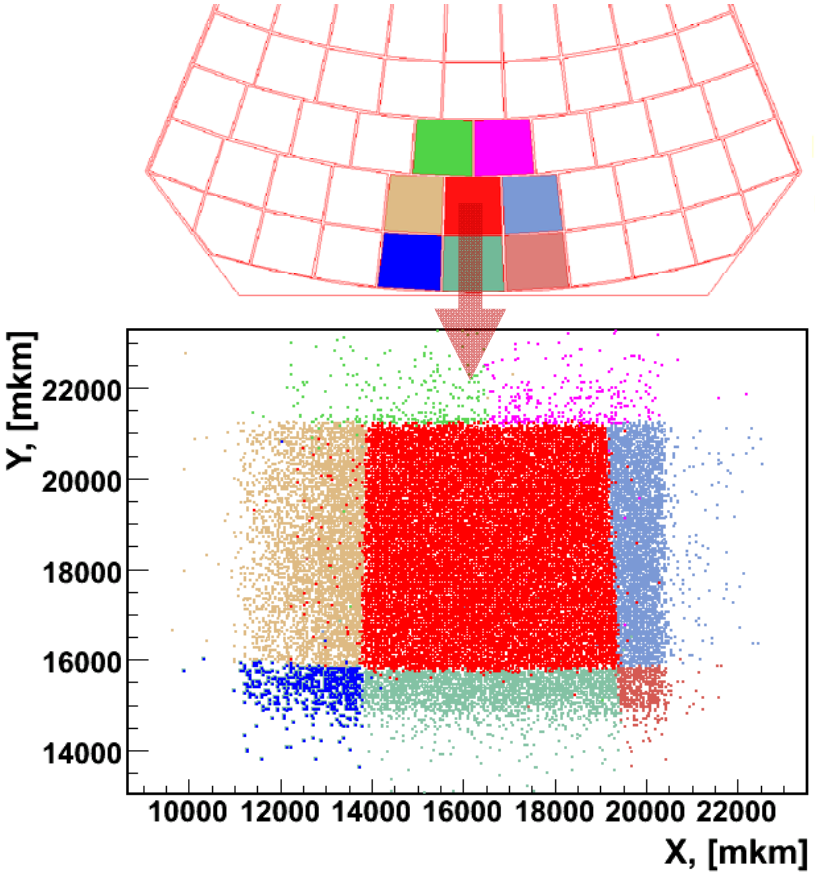


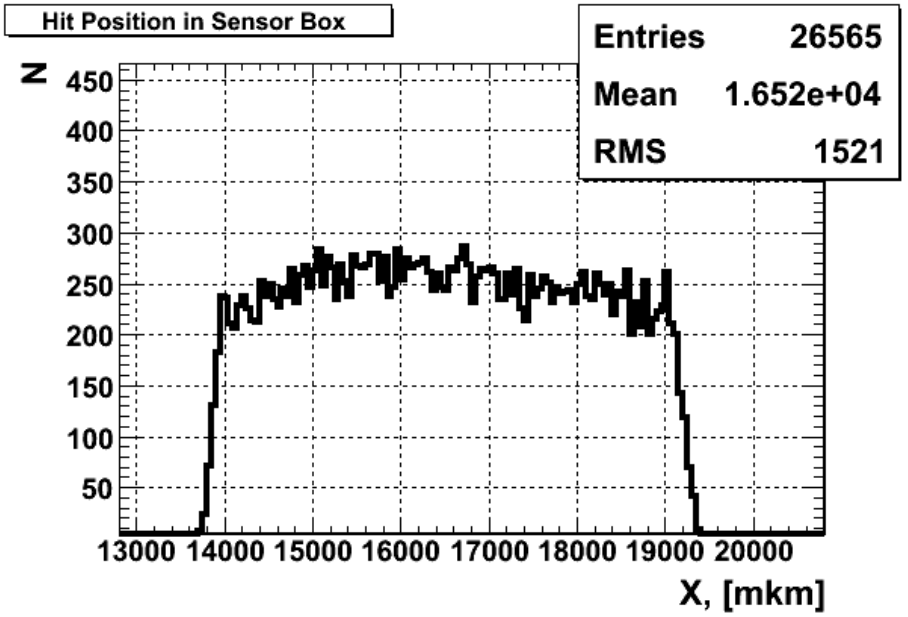
- Zeus MVD Telescope
- Precise XY Table
- Sensor Box
- 2 DAQ (Telescope and SensorBox)
- Veto for Telescope
- Pads irradiation with 4.5 GeV e-

- **CV measurements**
- **IV measurements**
- **Cross talk measurements**

- Track reconstruction algorithm implemented

Tracks Reconstruction

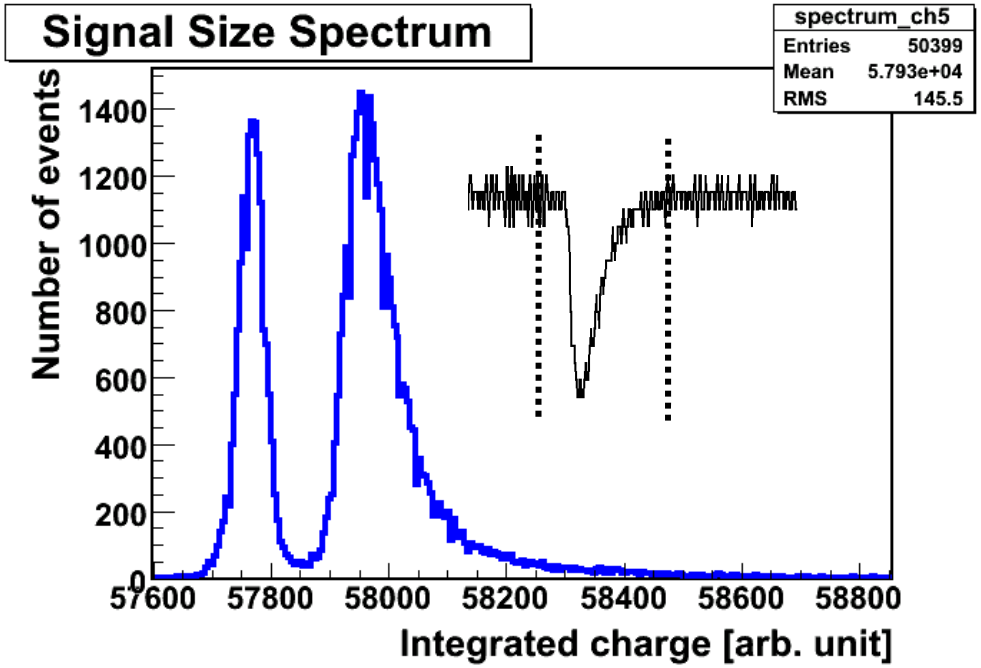




Number of hits as a function of reconstructed x position in sensor box

Tracks reconstruction is proved →
Characteristics of pads are investigated in respect to position

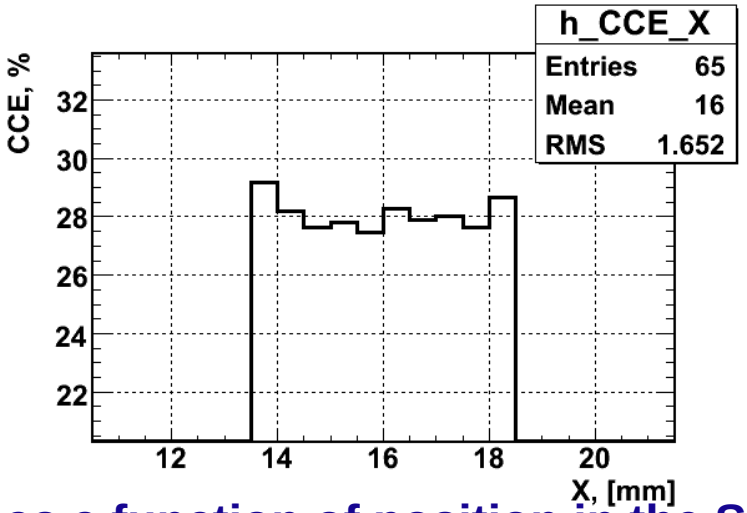
Charge Collection Efficiency



$$CCE = \frac{Q_{collected}}{Q_{induced}}$$

$$CCD = CCE\ d_{thikness}$$

$$S/N = \frac{MPV_{Signal}}{Sigma_{Pedestal}}$$



CCE ~ 30%, 23-34% all

S/N ~ 8, 6-12 all

CCE as a function of position in the Sbox

Future Steps

Simulation:

- Clustering algorithm optimization
- Marlin reconstruction procedure renewing for FLC group in Hamburg
- Geometry optimization and new geometry implementation

Prototype:

- Laboratory tests of GaAs sector
- Tracking upgrade
- ADC implementation to read out board for the GaAs prototype
- Test Beam preparation

Overview - Training

Courses:

German courses, B1 certificate by Goethe Institute
C++ courses
MC-PAD training events in Cracow and in Hamburg
Course on communication, oral and poster presentation skills
The European School of High-Energy Physics
Physic seminars, DESY-Humboldt University
Joint Instrumentation Seminar, DESY Hamburg

Teaching tasks or organizing activities:

Educational talk about Si detectors
GEANT4 workshop, tutor
Physic seminar
2 Summer Students supervisor
2 Diploma Students supervisor

Overview- Results

Publications

Articles: 2 – published, 1 - in preparation
Summer Students Report, Diploma Thesis

Presentations

Conferences: LCWS2010, DPG2010, QFTHEP2010
Workshops: FCAL Meetings in Zeuthen and in Cracow,
LC Forum in Hamburg, BCM at CMS in Zeuthen
Schools: The 2009 European School of High-Energy Physics
Group meetings: every month presentation
Physic Seminar in Humboldt University

3 Posters

Participation in test beams

ELBE, Rossendorf, February 2010
DESY, Hamburg, August 2010