EUDET in FCAL

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FCAL Collaboration
High precision design

VINCA, Belgrade
Univ. of Colorado, Boulder,
BNL, Brookhaven,
AGH Univ., INP & Jagiell. Univ. Cracow,
JINR, Dubna,
NCPHEP, Minsk,
FZU, Prague,
IHEP, Protvino,
TAU, Tel Aviv,

see: PRC R&D 01/02 (2002)

Instrumentation of the very forward region of the ILC detector

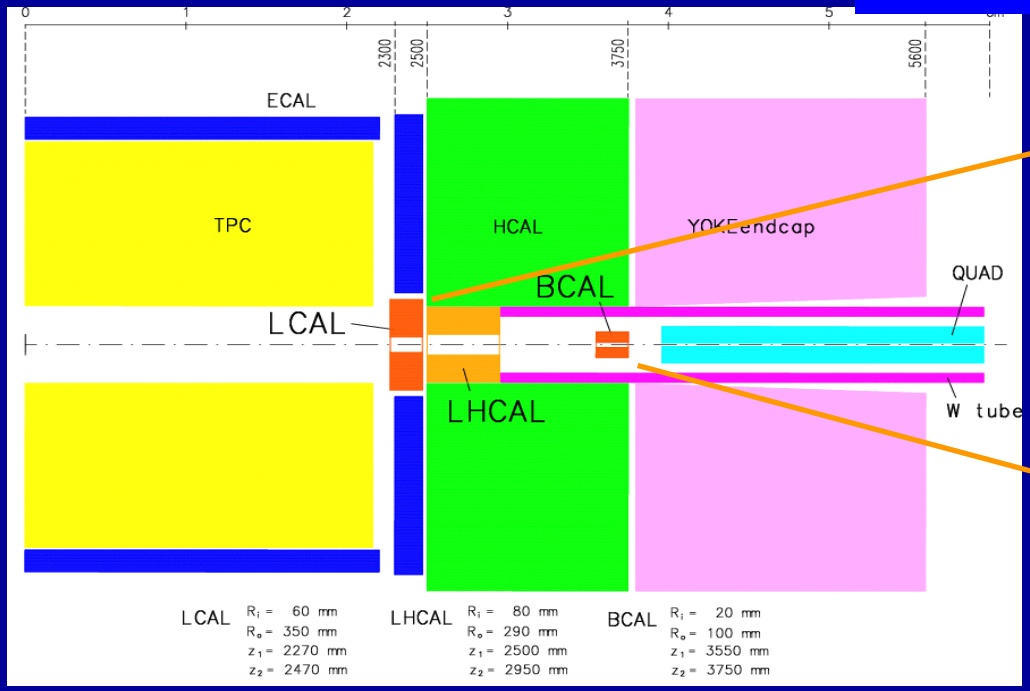
Participants of EUDET:

AGH Univ., INP & Jagiell. Univ. Cracow
FZU, Prague,
TAU, Tel Aviv,
DESY, Zeuthen

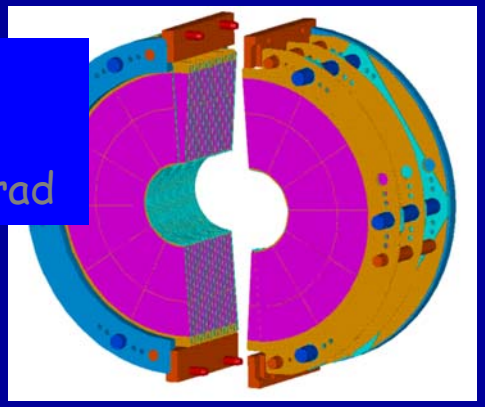
JINR applied for being associated

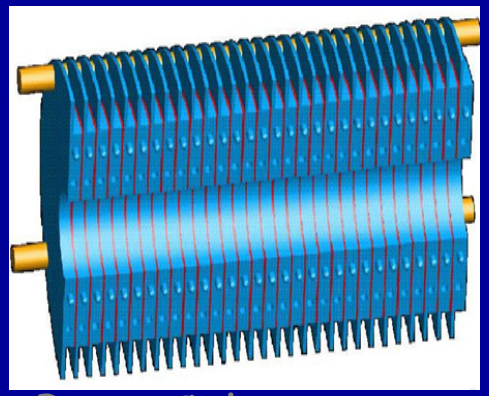
Functions of the very Forward Detectors

- Measurement of the Luminosity with precision $O(10^{-4})$
- Fast Beam Diagnostics and Luminosity Optimisation
- Shielding of the inner Detector
- Detection of Electrons and Photons at very low angle – extend hermeticity (Important for Searches)



LumiCal
30 layer Si:W
$26 < \theta < 155$ mrad

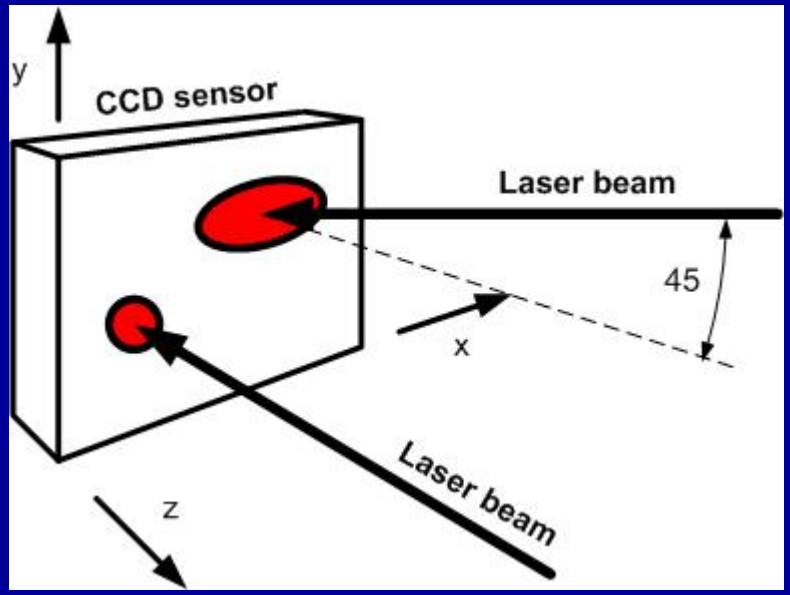




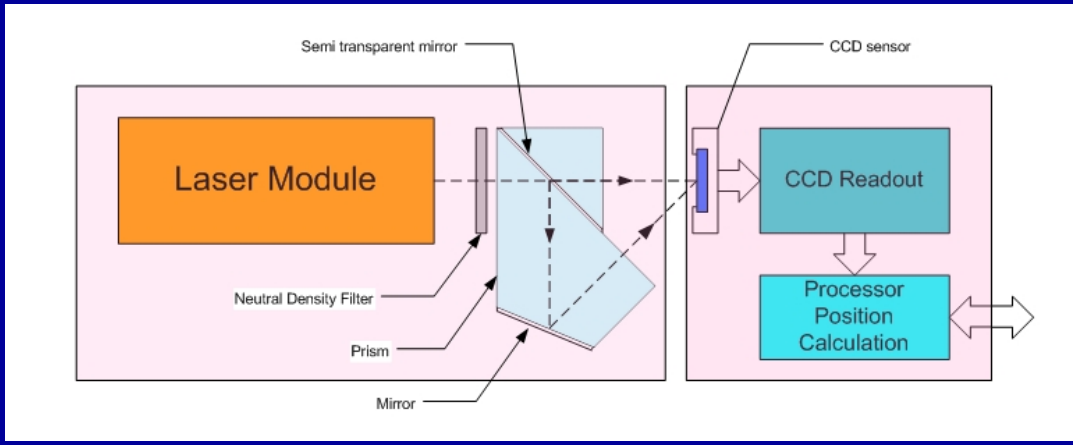
BeamCal
30 layer CVD diamond:W
$5 < \theta < 28$ mrad

Laser Positioning System

XYZ displacement measurement with two beams



Proposed setup with two beams and prism splitter:
Design and construction.



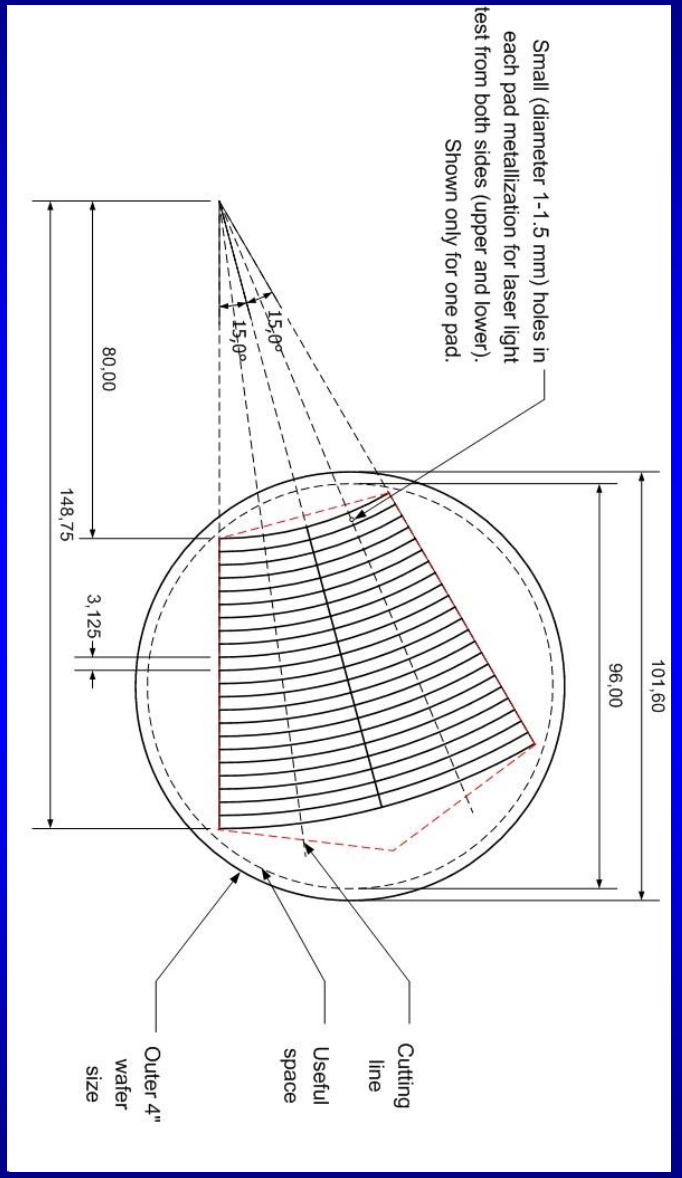
Laser Positioning System, Details

- New lasers with aspherical lenses – better spot – estimated cost of 1000 € (to be ordered)
- Beam splitter with half transparent mirror – designed – *suspended for the next year* (~1200 €)
- Improvement of algorithm to determine centre of two spots – cost of 500 € (temporary staff)
- Prototype – in progress
- Independent measurement of XYZ translations – Renishaw industrial system (0.1 μm resolution) – bought (900 €) and PC control card ordered (700 €)

Sensor Design and Test Facilities

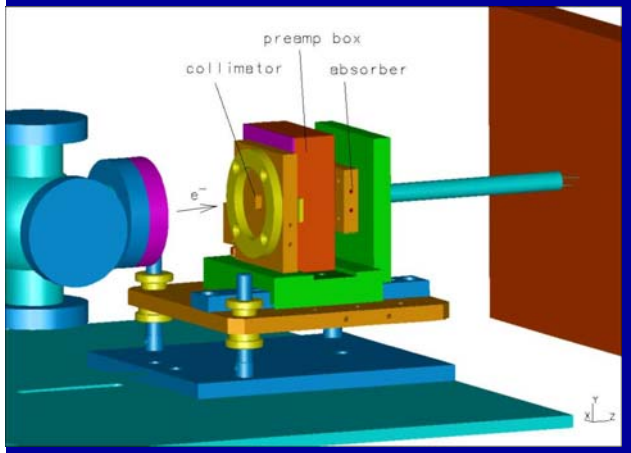
- Study of the performance with large area sensors with ionising particles
- Design of large area sensor planes, proof of mechanical accuracy, electrical features, response at the edges

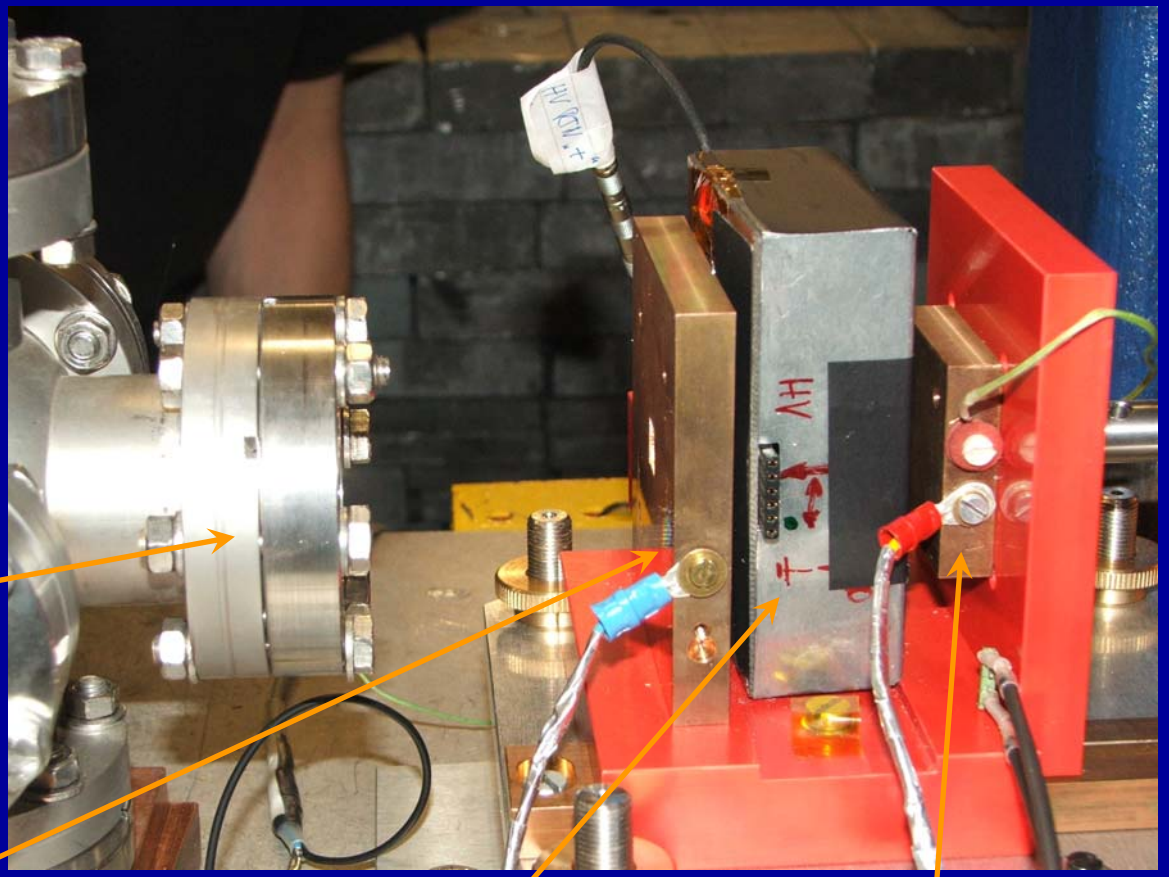
Test facilities (prob. stations, current and capacitance measurement) under installation in Zeuthen and Tel Aviv



- Production placed via JINR Dubna

Test Beam Equipment





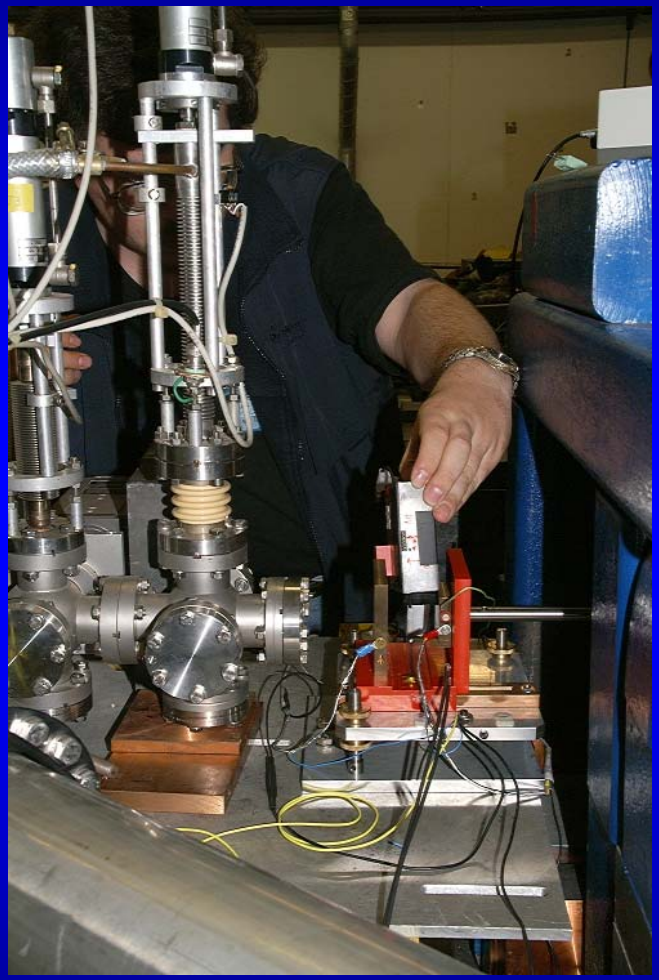
exit window of beam line

collimator (I_{Coll})

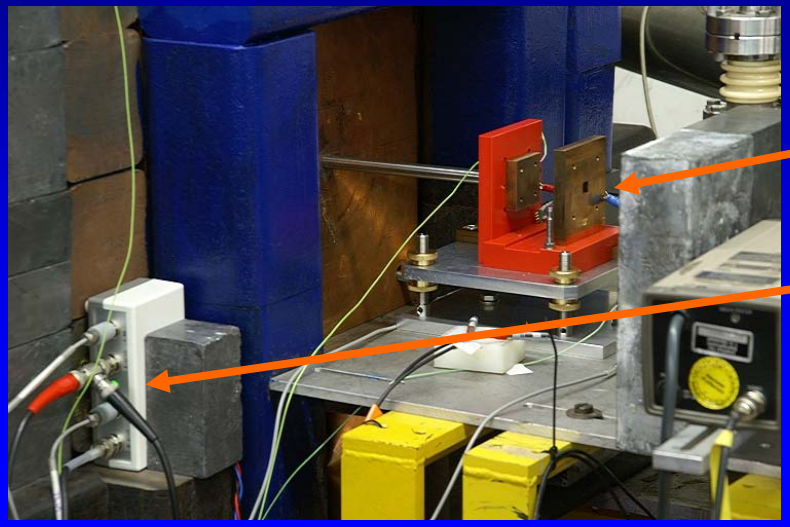
sensor box (I_{Dia}, T_{Dia}, HV)

Faraday cup (I_{FC}, T_{FC})

Used for Irradiation Tests at DALINAC



Beam Area: Equipment



Sensor holder

I-V conversion

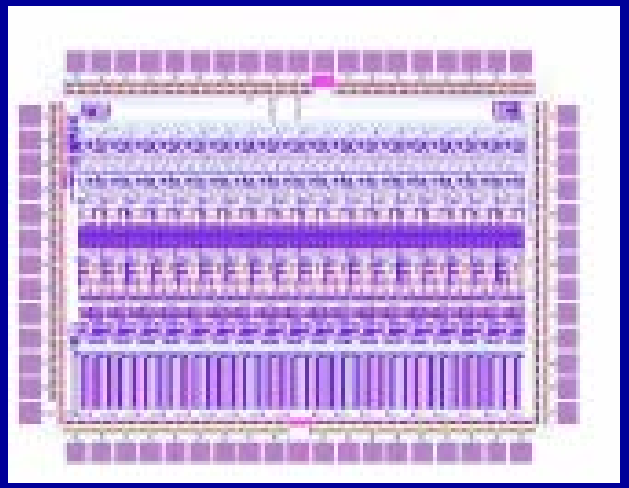
Power supplies and monitoring

Surveillance from control room

Readout Electronics

- Read-out electronics for test-beam measurements

Test measurements with the LAL FLC-phy 3, one chip instrumented and running, results for Munich WS



- Design of an electronics matching the accelerator needs: no progress so far.

Summary

First steps are done:

- Test beam equipment partially available and running, completion is ongoing
- Laser alignment 'proof of principle experiment' under construction
- Test facilities for sensors in Zeuthen and Tel Aviv; Zeuthen will be upgraded, Tel Aviv started to collect equipment
- Read-out electronics: Phys-3 chip under test