Demokritos

National Center for Scientific Research-Greece

RD50 Questionnaire

- ***Name of the Institution*** : ***NCSR Demokritos***
- *Contact person:* ***Dimitris LOUKAS***
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Names of group members and fraction of time to RD50 (indicative)

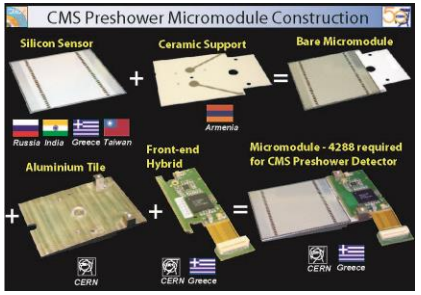
Name		Time (in FTE)
Dimitris Loukas	Physicist	0.3
Aris Kyriakis	Physicist	0.3
Giannis Kazas	Electronics Engineer	0.5
Panos Roussos	Electronics Engineer	0.5
Panagiotis Dimitrakis	Si Processing	to be defined
Pascal Normand	Nanotechnology , Micromachining	to be defined

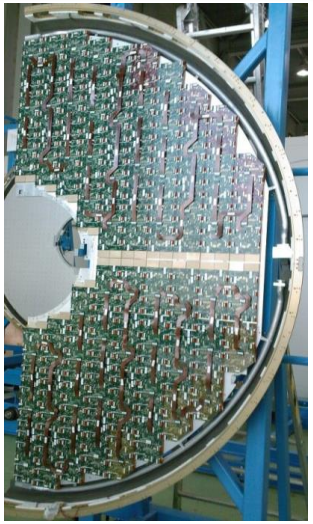
ECAL: The CMS Preshower detector design and construction

- 15 years of development and construction
- Silicon Detectors design & fabrication
  (Joint activity with the Microelectronics Institute)
- 600 micromodules (among 4800) assembled in Demokritos

Work consisting of

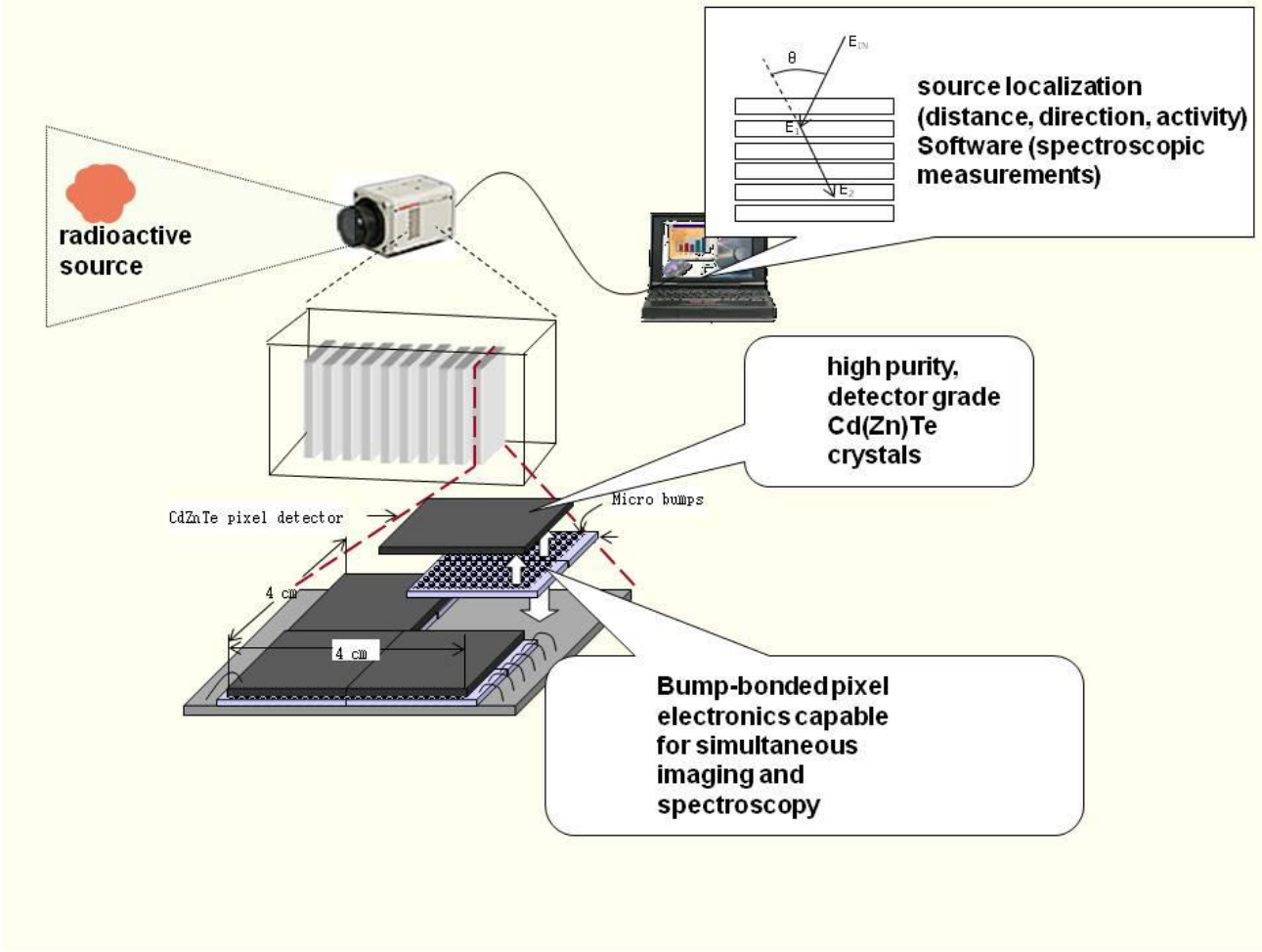
1) ASIC readout chip design (preliminary CMOS version),
2) 2) Si Det. design & fabrication
4) Micromodule assembly 4) Reliability tests,
5) Test beams 6) Integration





- Various VLSI chips for X-ray detection

FP7: The COCAE Project



- **Simulation, design and fabrication of prototypes, characterization**

- ***Irradiation facility (TANDEM) for radiation hardness studies***

Existing Resources in our Lab:

Semiautomatic wire bonding machine: Delvotec 5430, Automatic probe station: Carl Suss P150
SMD work and rework station: (Fritsh HS 905 &VS925), Design tools (Cadence, Sentaurus, OrCaD)
Electrical Characterisation equipment: (HP 4192A, KEITHLEI 6517A), Desiccator-Nitrogen-purged low-humidity storage system (TERRA UNIVERSAL), Climatic Chamber (to be ordered)

Resources at the Microelectronics department:

The department of Microelectronics at NCSR DEMOKRITOS constitutes the major micro and nano electronics facility at national level. Processing equipment of the department includes: 4 laminar hot-wall furnace tubes, 7 horizontal hot-wall furnace tubes, 2 horizontal LPCVD tubes for nitride, oxide (TEOS) polysilicon, 1 horizontal LPCVD tube for LTO, Ion implanter (EATON medium current, 200 keV), Optical lithography system (resolution down to 0.6 μm), Reactive Ion Etcher (ALCATEL), Metallization equipment, High Density Plasma Etcher, Different thin film deposition systems (Sputtering, MOCVD). In addition, equipment for electrical and optical characterization of devices is available.

Resources at the Department of Materials Science (IMS) :

- Ultra high vacuum system from AJA International (ATC-2200-V) accepting substrates up to 4 inches (uniformity ±2%, heating uniformity ±2% up to 850 ^{0}C).
- Deposition system (Cooke 404) updated with three new 2-inch sputter guns from AJA Inc and a turbo-molecular pump that creates 5E-9 Torr high vacuum
-SEM, TEM microscopy

Access to Deep Level Transient Spectroscopy (DLTS) equipment (University of Athens)

TANDEM:

5 MeV Tandem Accelerator: The beam energy is (Z+1)V MeV , where Z is the ion charge and V the terminal voltage. Beam spot can vary from 6 mm x 6mm to less than 1 mm x 1 mm. The machine can deliver monoenergetic protons in the range 800 keV - 4.0 MeV with resolution of few KeV. A typical maximum flux that can be achieved on a 2 mm x 2 mm spot is around 10^{12} protons/s. In addition there exist a monochromatic neutron irradiation facility for neutrons in the range 0.6 - 12 MeV and fluxes of 10^{8} - 10^{9} neutrons/cm^{2}/s, and resolution around 200 KeV.

X-rays:

X-ray tubes for irradiation and high rate tests