

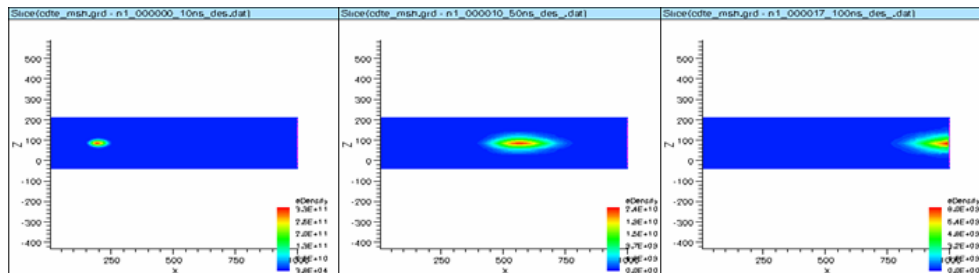
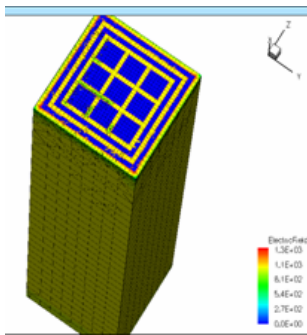
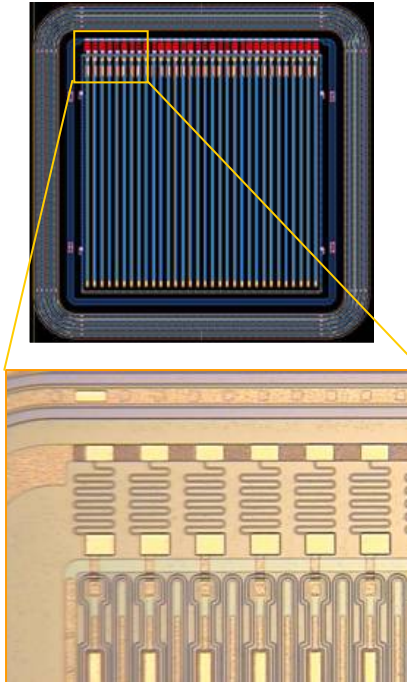
IMB-CNM interest in ILC

- We are a Microelectronics Institute, but with high interest in HEP activities
- Currently members of SILC Collaboration
 - **Foreseen activities:**
 - **MCM and packaging**
 - **Strip detectors**
- Special interest in:
 - **Detector development**
 - **Electronic read out chips design**
 - **Advanced packaging solutions**
 - **Device simulation**
 - **Radiation effects in components and materials**

Radiation detectors

Silicon radiation detectors

- Design
- Simulation
- Fabrication
- Characterization
- Pad, strip and pixel designs
- P-in-N, N-in-P and N-in-N technologies developed
- Silicon oxigenation to increase radiation hardness

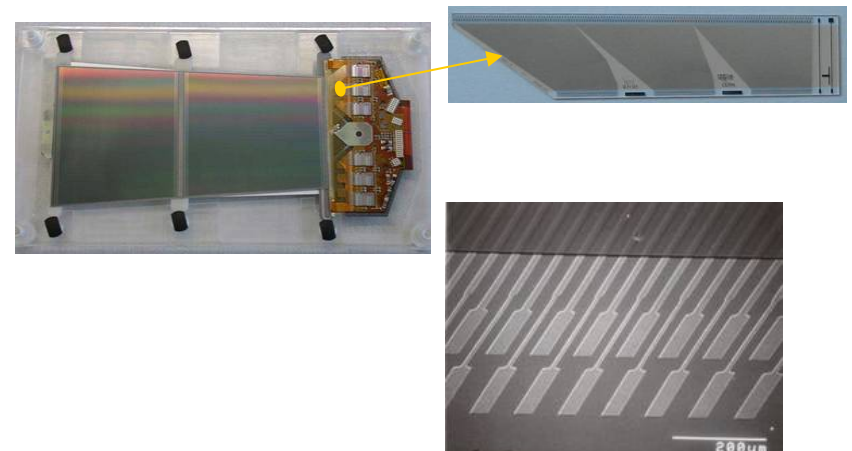


Radiation effects on devices and materials

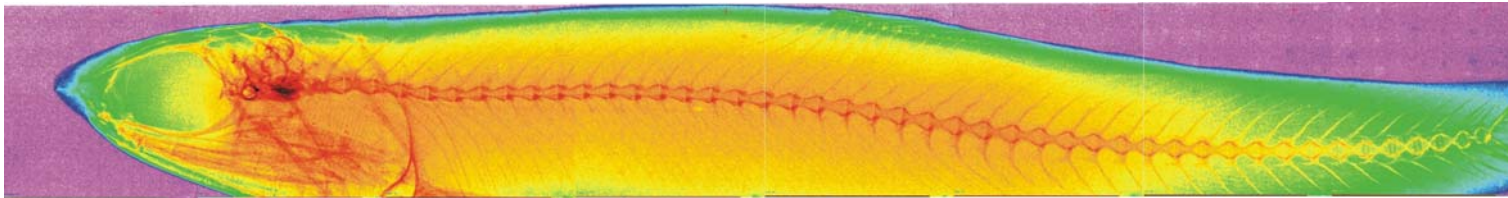
- Thin oxides for submicronic technologies
- Silicon radiation detectors
- MOS and bipolar devices
- Members of **RD50** CERN Collaboration

Pad pitch adaptors for detector modules

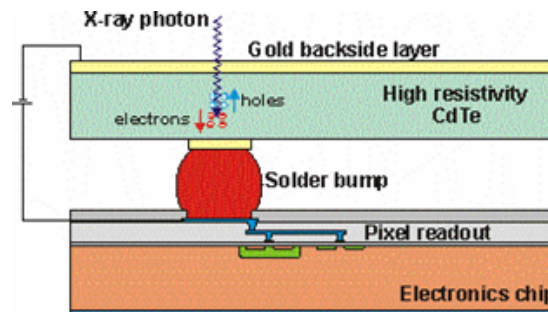
- **ATLAS-SCT** Forward Modules



Medical imaging systems

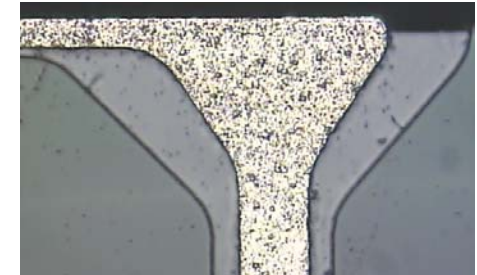
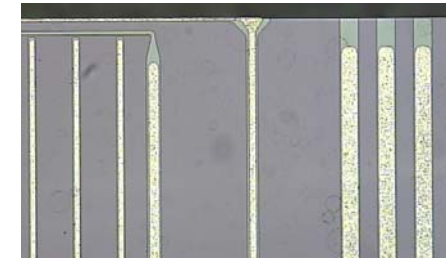
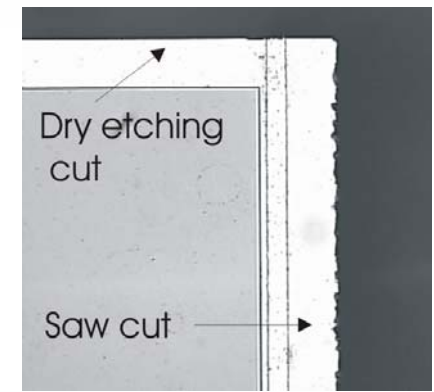
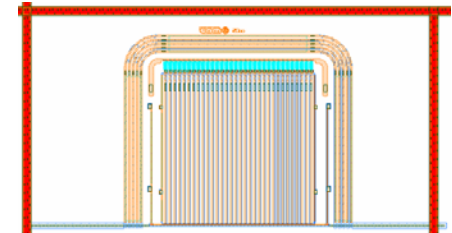
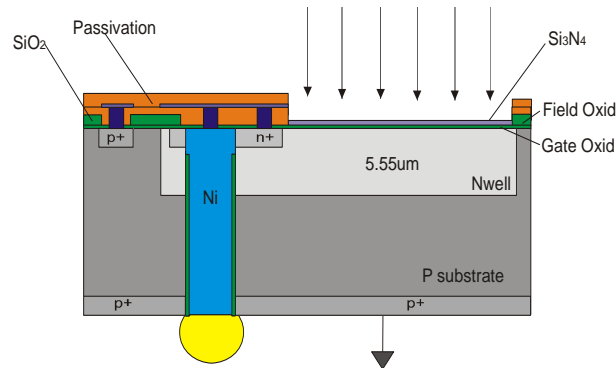
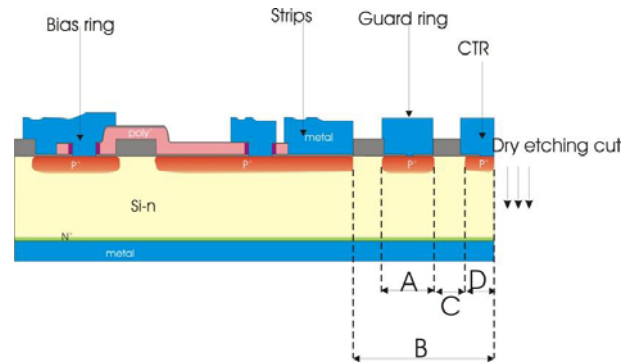
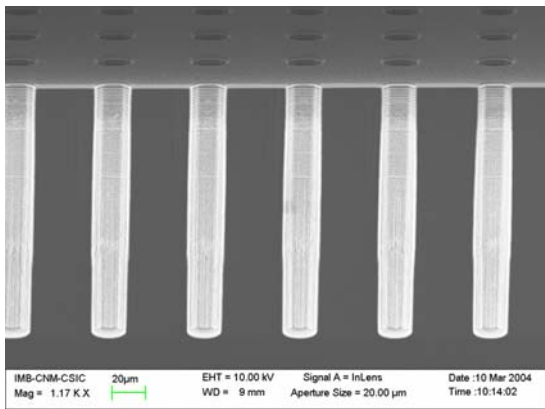
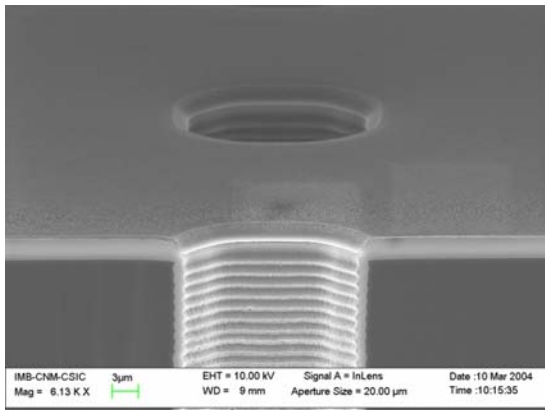


- X-ray radiation pixel detectors
- Real time stereotactic biopsy
- Complete pre-industrial system: Hardware, software, and chip design
- Aim: Develop a Mammography system
 - EC project DearMama.
 - Industrialization projects (PROFIT, CIDEM, Petri)
- Test Bench (HW+SW): Readout system for CERN Medipix2 chip
- Processing Images for medical applications



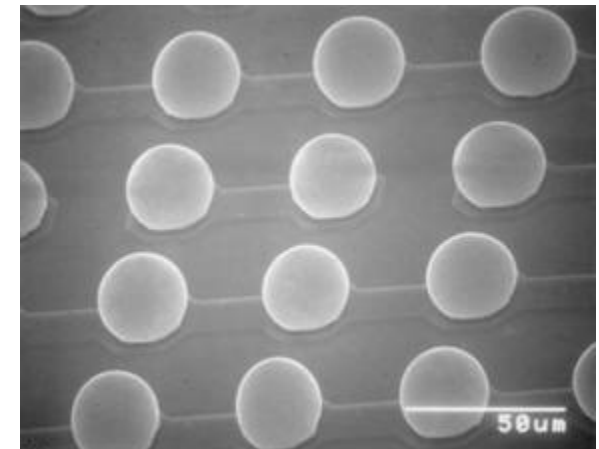
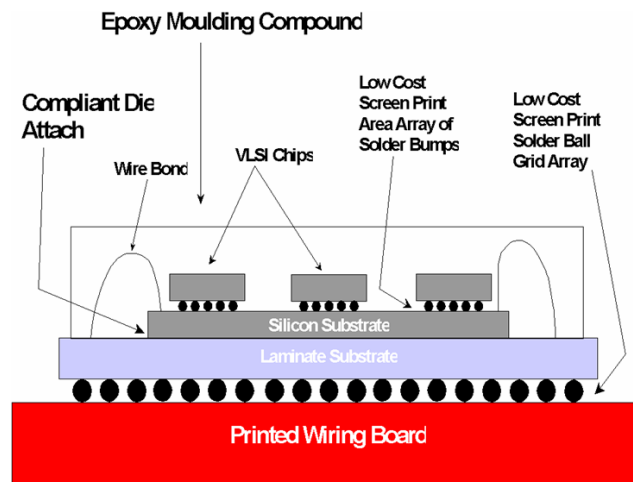
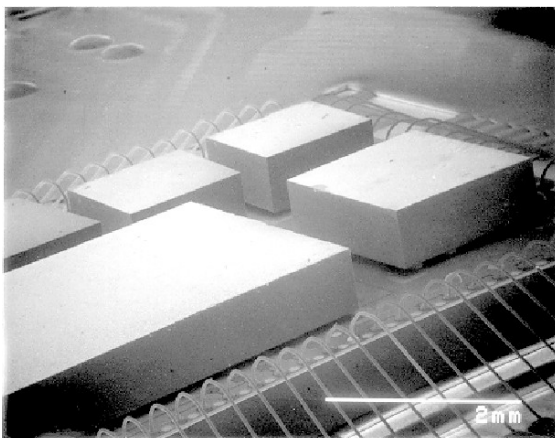
Silicon via holes with ICP RIE

- Examples of holes made at CNM
- Aspect ratio 25:1
- Minimum diameter tested 10 μm
- 3D detectors
- Edgeless detectors

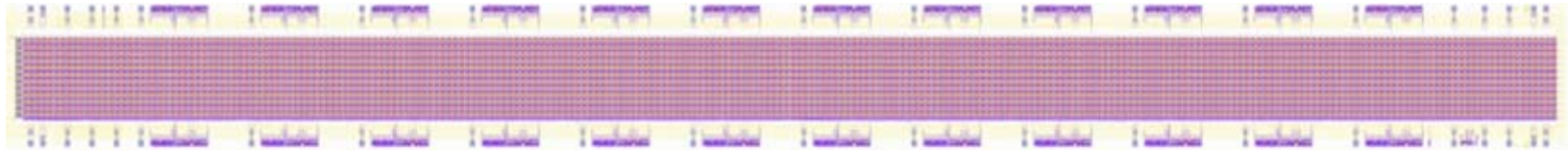


Advanced packaging & MCM modules

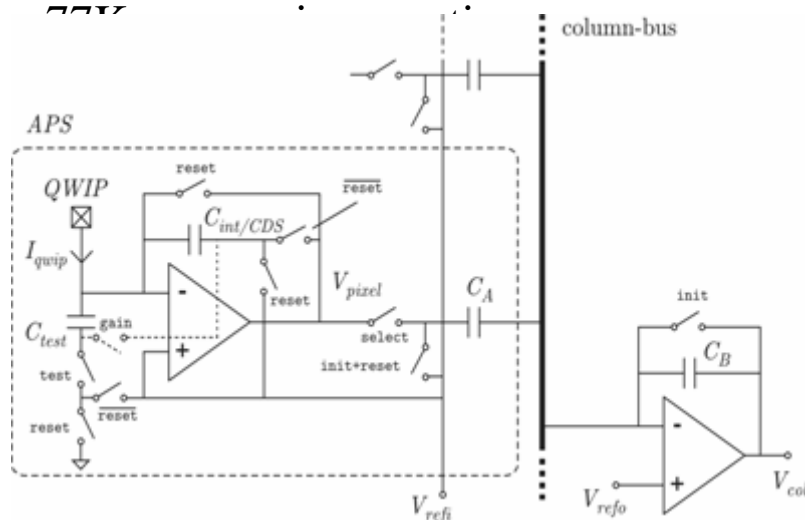
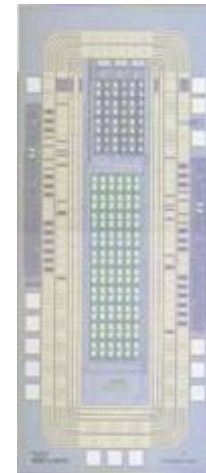
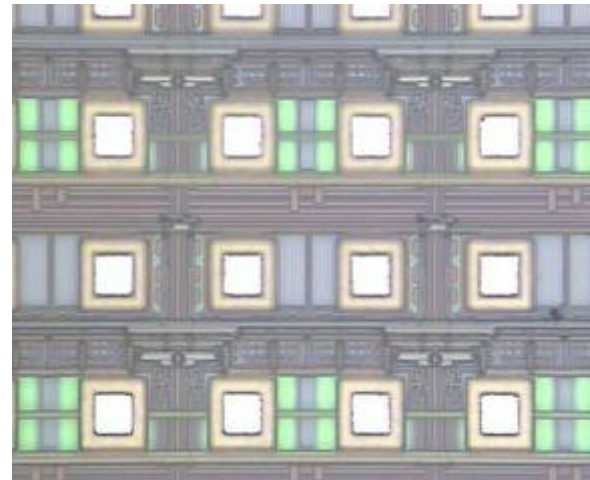
- **Multichip modules**
MCM-D technology
 - Standard pitch: 400 μ m. Screen printing
 - Fine pitch: 50 μ m. Solder electroplating
- **Fine pitch bump bonding**
- **Interest in 3D packaging development**



Circuit design for pixel systems



- **Example:** Read-Out IC for large arrays of photon IR sensors at cryogenic temperatures
- 6000 (500×12) QWIPs
- true IR video (e.g. 500×640@100fps)
- 215mW@3.3V



- APS functionality:
 - TDI, CDS, built-in test, charge multiplexing
- 50 μ m×100 μ m pix size
- 60ns mux time/pix
- 6 μ A consumption/pix

