



IFIC - Instituto de Física Corpuscular



# PARTICIPATION IN THE DESIGN AND R&D ACTIVITIES FOR A FUTURE LINEAR COLLIDER

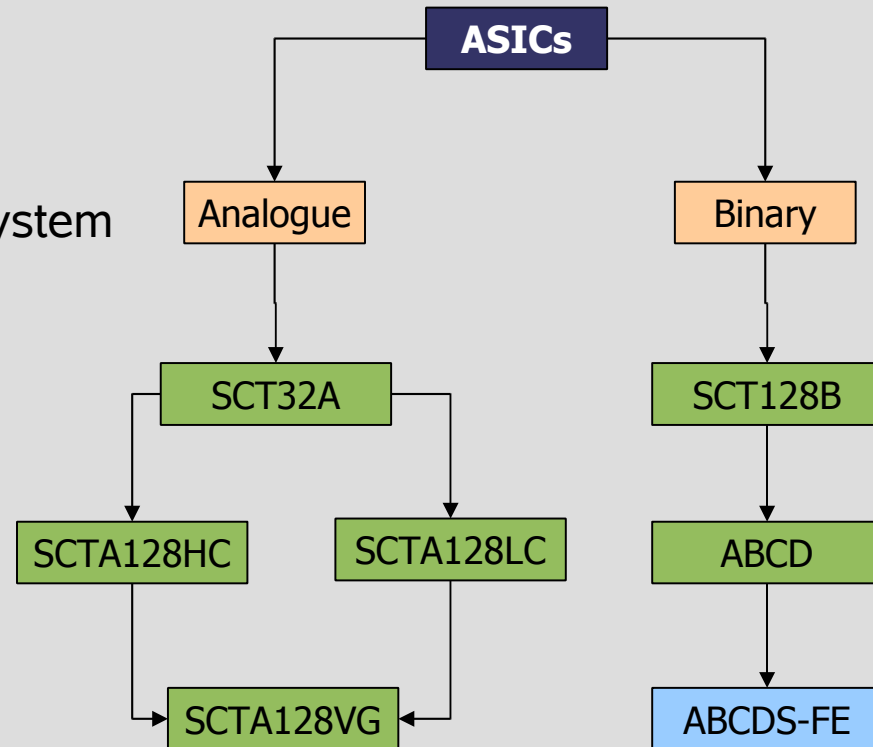
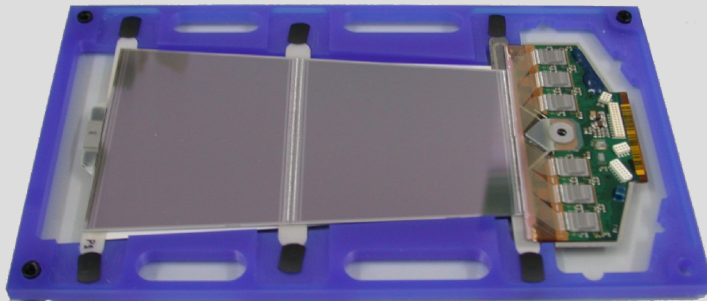
**IFIC - Valencia**

# Our group - Main activities

- ✓ ATLAS-SCT
- ✓ RD-50
- ✓ Medical Physics
- ✓ The near future:
  - ➔ Tracker for the ATLAS upgrade (SLHC)
  - ➔ ILC

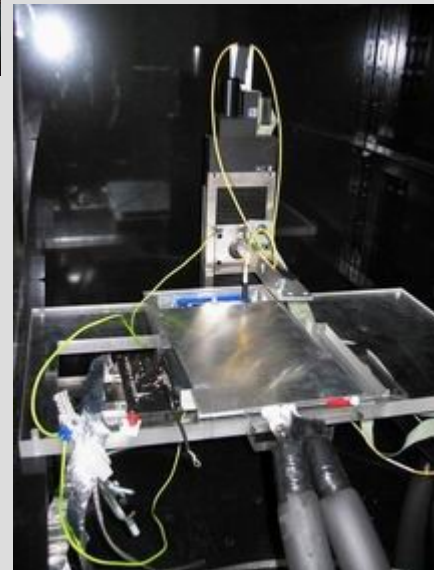
# ATLAS SCT

- ✓ Sensor characterization
- ✓ ASIC testing
  - DAQ s/w & h/w
  - Development of wafer screening system
- ✓ Module building
  - Build 10% of tracker modules
- ✓ Detector mechanics
  - Outer thermal enclosure



# RD-50

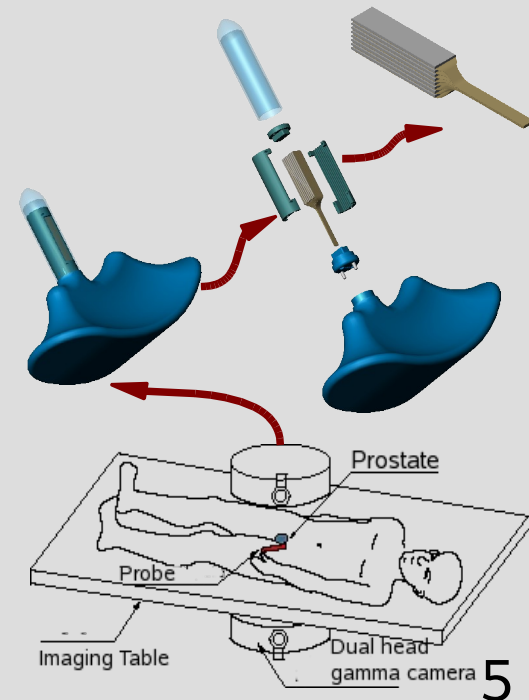
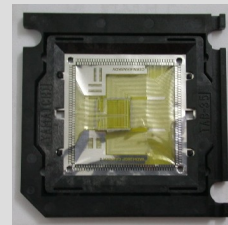
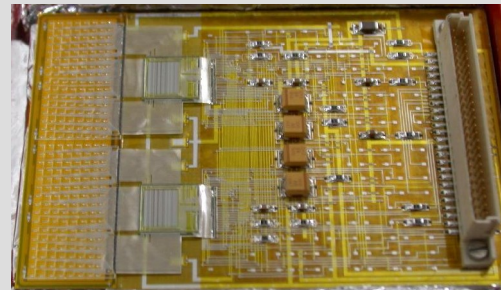
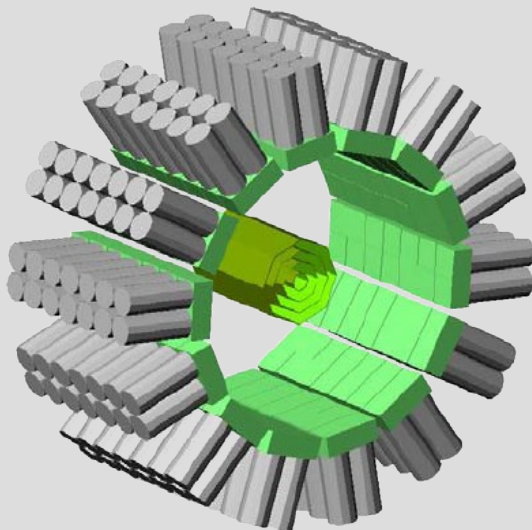
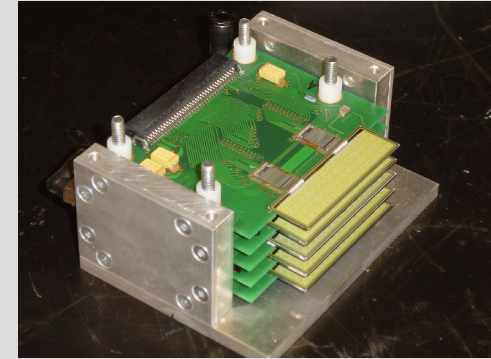
- ✓ Studying effects of annealing on irradiated sensors
  - Laser + source setup
- ✓ Coll. With CNM-Barcelona





# Nuclear Medicine

- ✓ Compton Imaging with silicon:
  - CIMA collaboration
- ✓ Prostate probe:
  - A stack of 1mm thick Si pad sensors
  - Packaging a big issue: TAB
- ✓ High resolution small animal PET:
  - Several stacks surrounding the *animal*
  - Sub-millimeter resolution
- ✓ High speed DAQ h/w and s/w

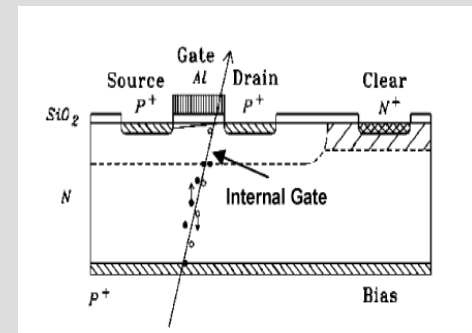
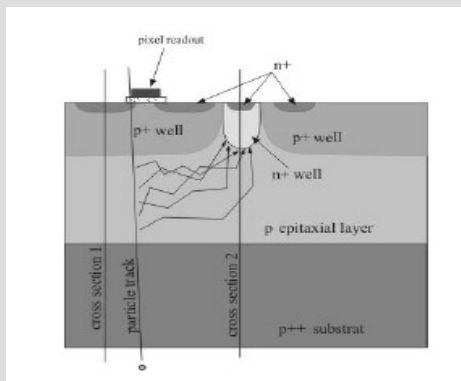


# The near Future: ATLAS upgrade

- ✓ Various routes to explore in collaboration with CNM and L'pool
  - Short strip high rad. Hard silicon sensors for the tracker
    - ↘ Successfully started by L'pool and CNM
      - N-on-p MCZ sensors: still “usable” up to fluences of  $10^{15}$  neutron eq.  $\text{cm}^{-2}$
  - New BiCMOS SiGe technology for the front-end
  - New CMOS 0.13 $\mu\text{m}$  technologies
  - Detector mechanics
  - ...

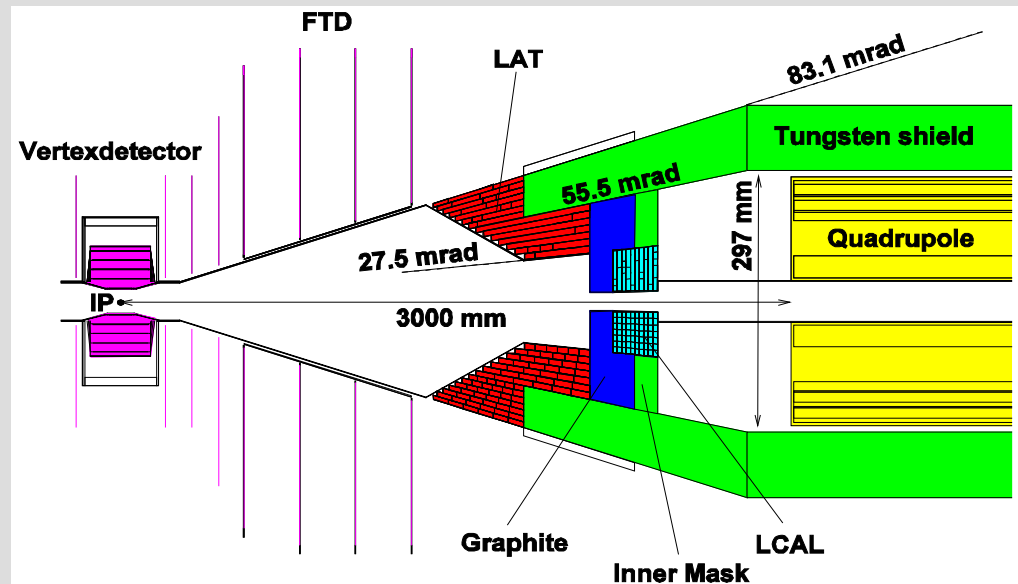
# The ILC.

- ✓ Natural step forward: from tracker to vertex detector
  - Acquire experience and *know-how* in new Si detector technologies
  - Active pixels.
- ✓ Many challenges at all levels imposed by low mass and granularity
  - Sensor
  - Mechanical support
  - Services: connectivity
- ✓ Explore different sensor technologies available:
  - MAPS: *Monolithic Active Pixel Sensors*
  - DEPFET: *Depleted Field Effect Transistor*
- ✓ Current collaborations:
  - L'pool, RAL: MAPS
  - MPI HLL, CNM: DEPFETS... starting



# ILC: Detector layout

- ✓ Participation in the design of the tracking system
  - Layout (related Physics)
  - Mechanics





# Conclusions

- ✓ A long way ahead...
- ✓ First steps made in defining our interests and in establishing possible collaborations.
- ✓ R&D based approach
  - Putting our hands on new sensor technologies for vertexing
  - Explore other aspects (like supports and services) taking advantage of our experience not only in sensors but in building a full detector system