

IFIC projects for the ILC

IFIC – Valencia

J. Fuster, C. Lacasta, P. Modesto, M. Vos, C. Alabau, A. Faus-Golfe, J. Resta, I. Carbonell



MINISTERIO
DE EDUCACION
Y CIENCIA

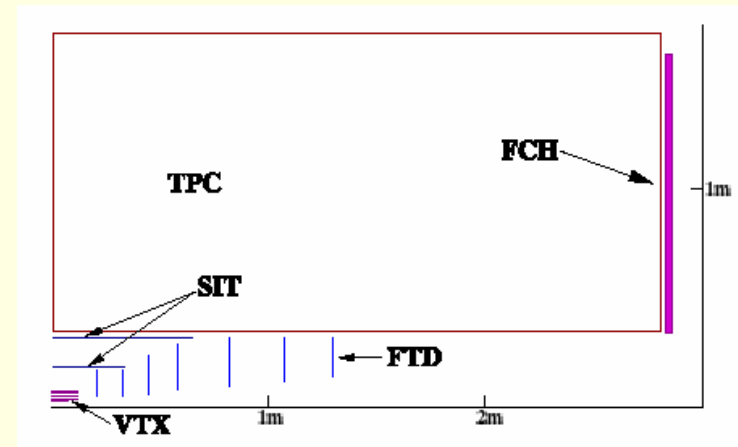
Valencia, 6 – 10 November 2006



IFIC - INSTITUTO DE
FÍSICA CORPUSCULAR

IFIC future contributions to ILC within the Detector framework

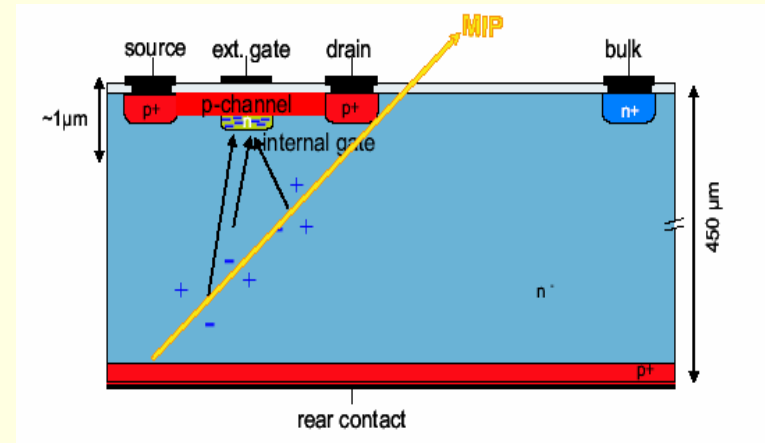
- **Layout studies:**
 - Would it be worth using pixel-like detectors outside the vertex?
- **Mechanical designs and constructions:**
 - Studies of mechanical supports for a VTX detector:
 - Prepare for the proof-of-concept staves.
- **Mainly explore the different VTX sensor technologies: MAPS & DEPFET**
 - Construction is still far in the future and may be something different, like the out-of-vertex pixel sensors or in any case the end-cap tracker.



DEPFET Pixels

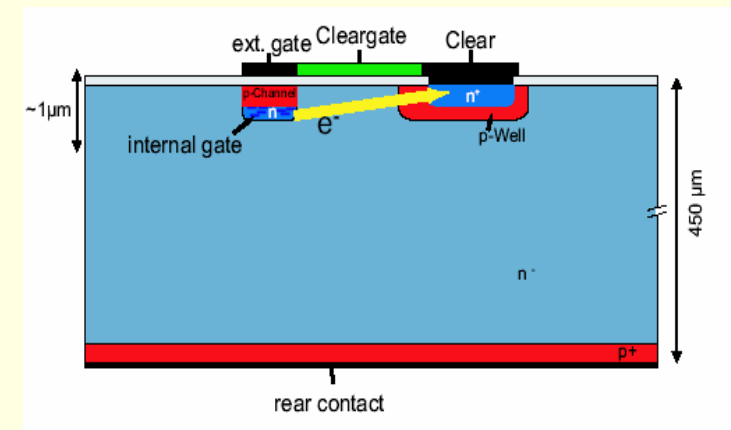
DEPFET principle:

- DEPFET is an active pixel device with a fully depleted substrate.
- The first amplification stage is realized by a FET that is embedded into the silicon substrate.
- The charge is accumulated in the internal gate of the embedded transistor.



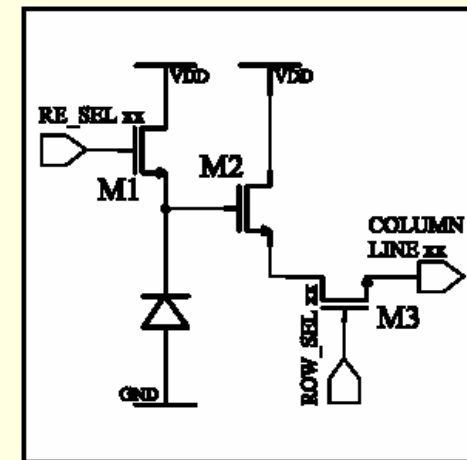
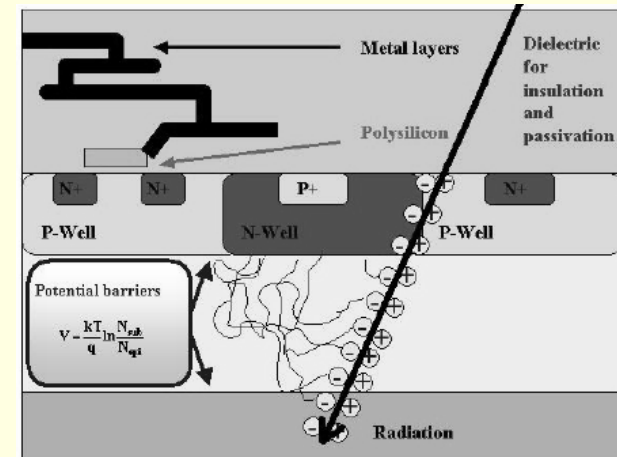
DEPFET clearing operation:

- The accumulated charge must be removed after reading.
- A high positive voltage is applied to the clear contact.



MAPS Pixels

- MAPS principle:
 - Uses a non-depleted lightly doped epitaxial layer as active volume.
 - The epi-layer is placed between two high-doped p substrates which create potential barriers for the electrons.
 - The electrons are collected by diffusion.
 - 100 % fill factor, required for tracking applications.
 - Signal read-out achieved by three in-pixel transistors.
 - Signal read-out based in source-follower configuration.



Read-out chain

Where we are...

- DEPFET (MPI-Munich, Bonn Univ., ...):
 - Testing the DEPFET readout chip (CURO):
 - Characterization of current version:
 - Internal calibration.
 - Radioactive source.
 - Laser.
 - Helping in the design of the new chip.
 - Participating in test-beams:
 - August 2006 (CERN).
 - October 2006 (CERN).
 - ...
- MAPS (RAL and Strasbourg):
 - Negotiation stage.

