

# RD50 New Observer Member Request

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# School of Engineering, Electronic Engineering Group (GIE)

- 7 Engineering Degrees  
(Aeronautics, Telecomm,  
Civil, Electronics, Industrial...)
- PhD. Courses in Electronics,  
Signal Processing and  
Communications

5500 undergraduate students

15 Ph.D. students in the Electronic  
Engineering Dpt.

**55 researchers in Group of**

**Electronic Engineering:**

-Analog and Digital VLSI design

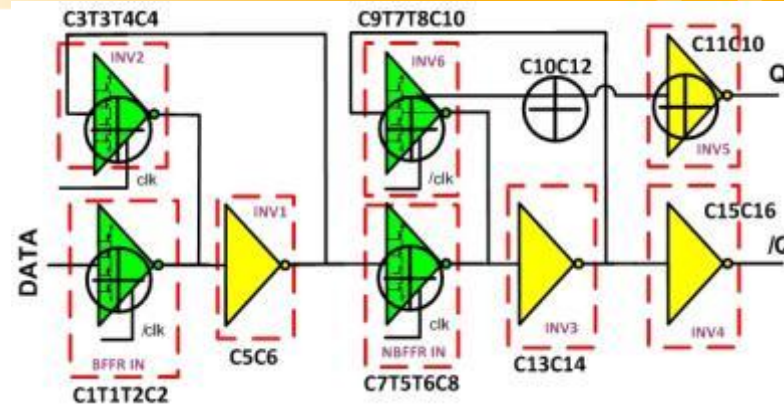
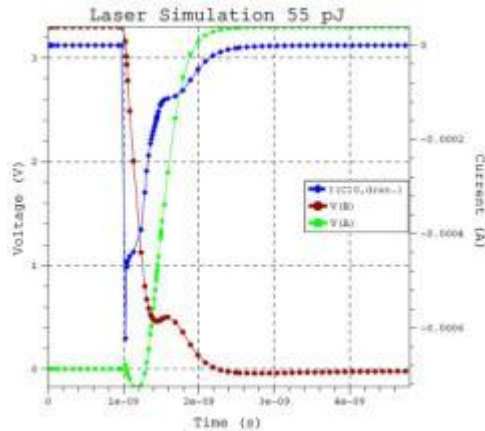
-Radiation and  $\mu$ Electronics



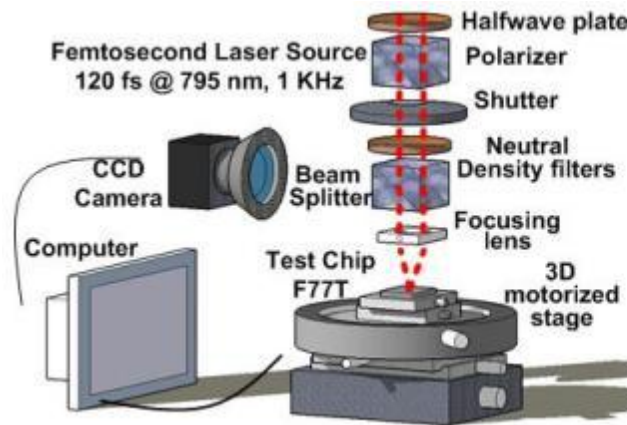
## Some GIE Activity related to Radiation Effects on Electronics

- **Emulation of SEE with ultrashort pulsed laser**, Research Project 2007-2009, PNE-034/2006, Spain Government.
- **Radiation Effects in Aerospace Electronics**, Research Project 2007-2010, ESP2007-65914-C03-03, Spain Government.
- **Radiation Effects in Aerospace Electronics, 2**, Research Project 2011-2013, TEC2010-22095-C03-01, Spain Government, *ongoing*.
- **SEE Electrical Simulator**, ESA Contract under agreement, *ongoing*
- **High Capacity, High Speed IC test system for automatic fault injection and analysis**, ESA Contract 22981/09/NL/JK, *ongoing*
- **Effects of Fast Neutrons in fiber optical sensors**, nTOF collaboration, *ongoing*
- **Effects of Fast Neutrons in 3D Silicon Detectors**, nTOF+CNM-IMB, *ongoing*
- **Utilization of Ion Accelerators for Studying and Modelling of Radiation Defects in Semiconductors and Insulators**, IAEA research agreement 17034, *ongoing*

## Pulsed Laser SEE Emulation



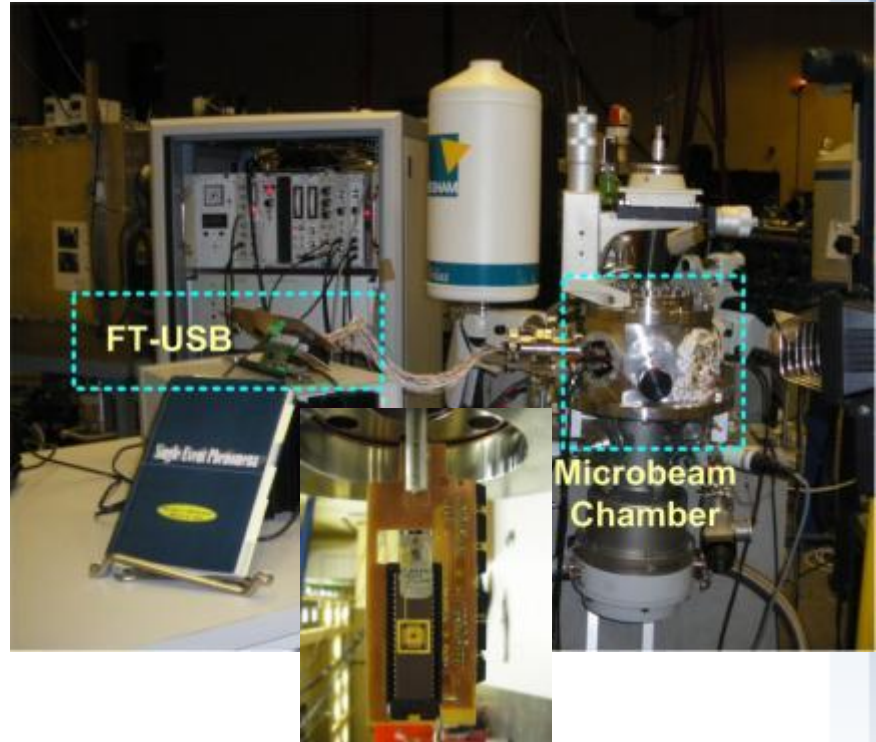
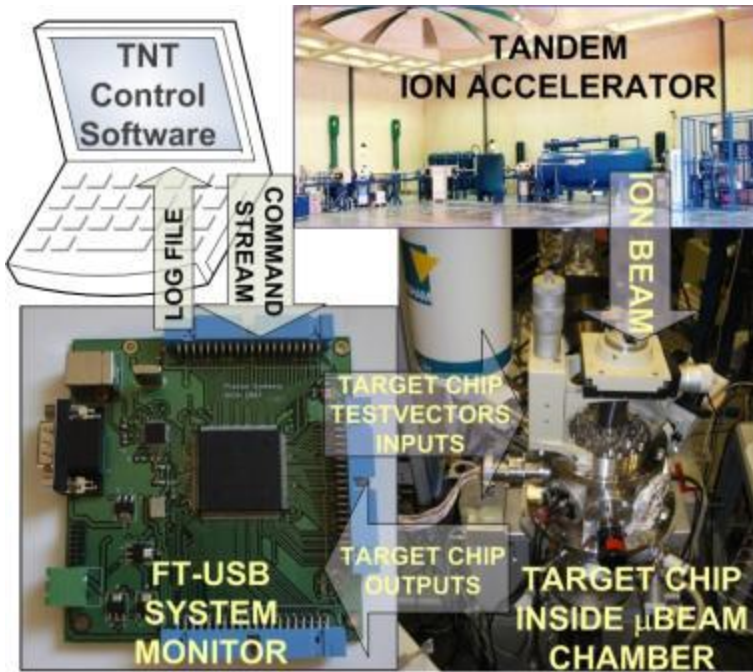
Illumination of VLSI with 800 nm femtosecond pulsed laser at the Spanish Ultrashort Pulsed Laser Centre (CLPU, University of Salamanca, Spain)



**Pulsed laser SEU Cross-Section measurement using coincidence detectors.** F.R.Palomo, J.M.Mogollón, J.Nápoles, H.Guzmán-Miranda, A.P.Vega-Leal, M.A.Aguirre, P.Moreno, C.Méndez, J.R.Vázquez de Aldana. *IEEE Transactions on Nuclear Science*, 56(4):2001-2007, 2009.

**Mixed-mode simulations of bitflip with pulsed laser .** F.R.Palomo, J.M.Mogollón, J.Nápoles, M.A.Aguirre. *IEEE Transactions on Nuclear Science*, 57(4):1884-2991, 2010.

# Ion SEE and Dose Effects in VLSI

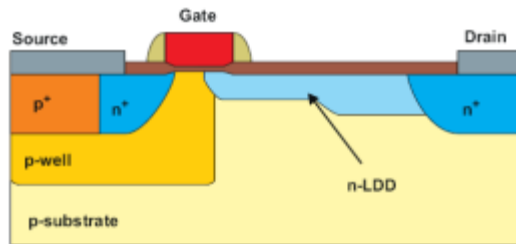


Irradiation of VLSI circuits using the ion microprobe station at the Spanish Accelerator Centre (CNA, University of Sevilla, Spain)

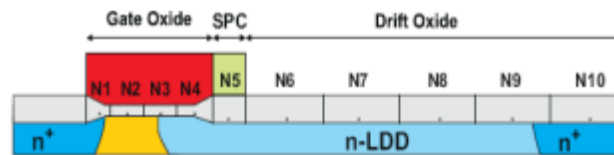
*Early works on the nuclear microprobe fine tuning for microelectronics irradiation tests at CEICI (Sevilla, Spain).* F.R.Palomo, Y.Morilla, J.M.Mogollón, J.García-López, J.Labrador, M.A.Aguirre. *Nuclear Instruments and Methods in Physics Research B*, 269(20):2210-2216, 2011.

*Developing the IBA equipment to increase the versatility of CNA.* Y.Morilla, M.C.Jiménez-Ramos, J.García-López, J.A.Labrador, F.R.Palomo, I.Ortega-Feliú. *Nuclear Instruments and Methods in Physics Research B*, 273(2):218-221, 2012.

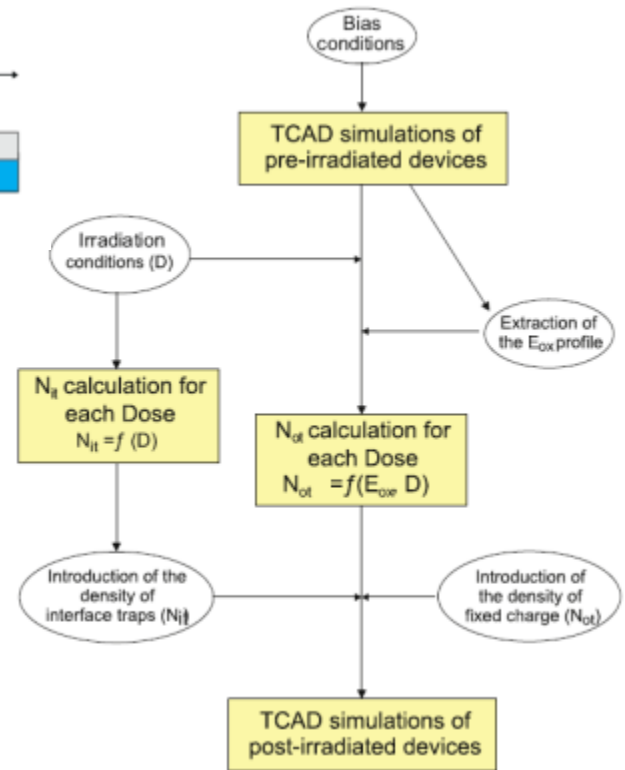
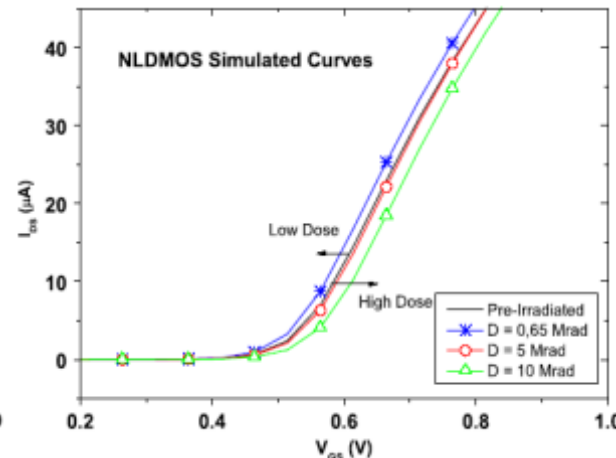
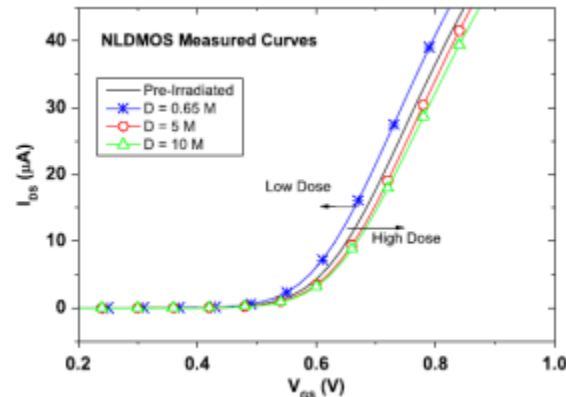
# TCAD Simulation of Dose Effects (TID, DDD)



NLD MOS



NLD MOS



Sentaurus TCAD TID, DDD and SEE modelization in collaboration with CNM-IMB (CSIC, Barcelona, Spain).

*Simulations of femtosecond pulsed laser effects on MOS electronics using TCAD Sentaurus customized models.* F.R.Palomo, P.Fernández-Martínez, J.M.Mogollón, S.Hidalgo, M.A.Aguirre, D.Flores, I.López-Calle, J.A de Agapito. *International Journal on Numerical Modelling: electronic networks, devices and fields*, 23(4-5):379-399, 2010.

*Simulation Methodology for dose effects in lateral DMOS transistors.* P.Fernández-Martínez, F.R.Palomo, S.Díez, S.Hidalgo, M.Ullán, D.Flores, R.Sorge. *Microelectronics Journal*, 43(1):50-56, 2012.

# Summary

- Five years of experience in the field
- Extensive Know-How in pulsed-laser experiments, ion experiments & TCAD modeling.
- To be observers of RD50 is important for us because:
  - Enhanced networking with other interested institutes
  - The issues related with component irradiation at colliders are much complex than in space missions, we will benefit from this broader experience
  - It is a natural step for us, because we are naturally interested in radiation damage in components.
- We can share/improve our capabilities and know-how within the RD50 collaboration.



# Thanks for your attention

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