Session B: Devices and Integrated Circuits

Chair: F. Bezerra and W. Pribyl

B-1 **Verilog-A Modeling of Radiation-Induced Mismatch Enhancement.**
Maxim Gorbunov, Igor Danilov, Pavel Osipenko : Scientific Research Institute of System Analysis, Russian Academy of Sciences
Gennady Zebrev : Moscow Engineering Physics Institute (National Research Nuclear University)

Physical model of TID effects is embedded to BSIM3v3 model implemented using Verilog-A. Radiation-induced mismatch enhancement due to the combined action of technology variations and electrical regime difference is demonstrated by simulation.

B-2 **Modeling Ionizing Radiation Effects in 90 nm Bulk CMOS Devices.**
Ivan Sanchez Esqueda, Hugh J. Barnaby, Keith E. Holbert : Arizona State University
Younes Boulghassoul : University of Southern California

An approach for incorporating the effects of TID into surface-potential-based compact models by analytically modeling the buildup of oxide trapped charge using a set of parameters extracted from 2D technology computer aided design (TCAD) device simulations.

B-3 **Performance and TID Radiation Response of a Diamond Vacuum Lateral Field Emission Transistor.**
Jim Davidson, Ken Galloway, Weng P. Kang, Bo Choi : Vanderbilt University
Karthik Subramanian : Intel Corp.

A nanodiamond lateral field emission vacuum microelectronic transistor and its electronic properties and hardness to high (20 Mrad) dose X ray exposure is described. No changes in the device structure or electrical behavior were observed.

B-4 **Proton-induced mobility degradation in FinFETs with stressor layers and strained SOI substrates.**
Daisuke Kobayashi, Eddy Simoen, Alessio Griffoni, Cor Claeys : IMEC
Sofie Put : EE department, Katholieke Universiteit Leuven
Marc Poizat : ESTEC
Kazuyuki Hirose : Institute of Space and Astronautical Science, JAXA

FinFETs on tensile-strained and non-strained SOI substrates have been irradiated by 60-MeV protons. Additional use of tensile and compressive stressor layers can exhibit complex effects on radiation-induced mobility degradation depending on the kind of substrates.

B-5 **Analysis of Total Ionizing Dose Impact on a Typical Current Feedback Amplifier.**
Stephanie Perez, Laurent Dusseau, Yago Gonzalez Velo, Nicolas Roche,
Jerome Boch, Jean Roch Vaille, Frederic Saigne : IES
Robert Ecoffet : CNES

The impact of Total Ionizing Dose on the AD844 Current Feedback amplifier is investigated. Circuit analysis is conducted in order to determine the degradation mechanisms at play with a predictive approach.

Posters for Session B

PB-1 1.8 MeV proton radiation effects on substrate resistivity of n-type MOS capacitors.

Richard Arinero, Antoine Touboul, Frederic Saigne : IES
Cher Xuan Zhang, Nadia Rezzak, Ronald Schrimpf, Daniel Fleetwood, Bo Choï, Anthony Hmelo : Vanderbilt University

We have irradiated MOS capacitors with 7 nm SiO_2 dielectrics by 1.8 MeV protons. We have observed an increase of the substrate resistivity for fluences higher than 5×10^{12} cm^{-2}, resulting from proton-induced displacement damage.

PB-2 Ionizing Radiation Response of Floating Gate Devices under Bias Controlled Cycled Measurement.

Mariano Garcia Inza, Jose Lipovetzky, Eduardo Redín, Sebastián Carbonetto, Adrián Faigón : Facultad de Ingeniería - Universidad de Buenos Aires

Floating Gate Metal Oxide Semiconductor structures, designed and fabricated in a CMOS process, were irradiated under the Bias Controlled Cycled Measurement novel technique conditions. Measurements results are presented.