School of Electrical, Computer and Energy Engineering

M.S. Final Oral Defense
Modeling and Simulation of Ionizing Radiation Effects
in Pipeline Analog to Digital Converters

by
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04/11/2013
1:30 – 2:30 PM
GWC 305

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Abstract
Low Power, High Speed Analog to Digital Converters continues to remain one of the major building blocks for modern communication systems. Due to continuing trend of the aggressive scaling of the MOS devices, the susceptibility of most of the deep-sub micron CMOS technologies to the ionizing radiation has decreased over the period of time. When electronic circuits fabricated in these CMOS technologies are exposed to ionizing radiations, considerable change in the performance of circuits can be seen over a period of time. The change in the performance can be quantified in terms of decreasing linearity of the circuit which directly relates to the resolution of the circuit. Analog to Digital Converter is one of the most critical blocks of any electronic circuitry sent to space. The degradation in the performance of an Analog to Digital Converter due to radiation effects can jeopardize many research programs related to space. These radiation effects can completely hamper the working of a circuit. This thesis discusses the effects of Ionizing radiation on a 11 bit 325 MSPS pipeline ADC. The ADC is exposed to different doses of radiation and performance is compared.