

ADVANCED INSTRUMENTATION SEMINARS

September 10, 2019

1:30 PM

Kavli 3rd Floor Conf.

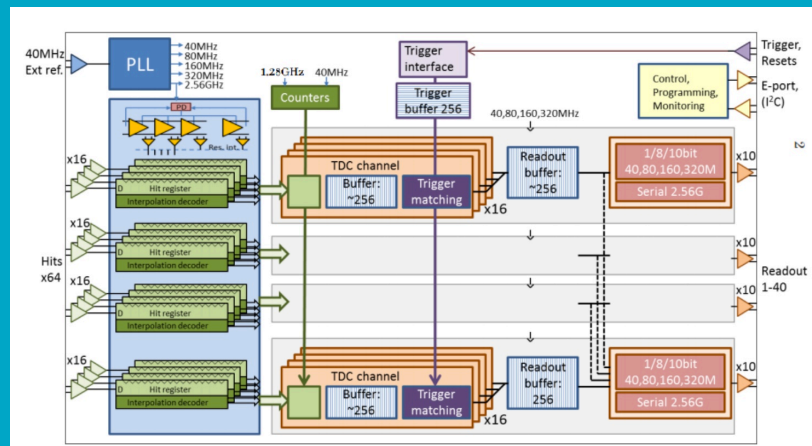
Radiation Hard Integrated Circuit Design

GUEST SPEAKERS –

Valentijn De Smedt

& Jeffrey Prinzie

Katholieke Universiteit Leuven



In the era of complex systems on chip (SoCs), clock and timing generation is required in nearly any application. These timing generators supply clock signals to digital modules, act as heartbeats for serial communication links or provide picosecond accurate reference information to time-interval sensors. Phase Locked Loops are the main building block that provide clock signals. However, in the nuclear, space and high-energy physics applications, ionizing radiation effects degrade these circuits significantly and produce soft-errors which can disturb an entire system. In this seminar, the application of these timing blocks in harsh environment.

This seminar focuses on the design issues of ultra-high voltage (up to 1000 V), high-power integrated circuit design for radiation environments. Starting from a 1kV integrated motor driver, the impact of ionizing radiation is discussed and challenges are identified. A comparison is made between SiC and bulk silicon technologies in terms of hardness towards particle strikes and total ionizing dose. Circuit- as well as technology solutions will be discussed, showing the trade-off between HV and Radiation tolerance. Special attention will go to simulation issues in switched converters. The seminar ends with the (system) design of a 200V radiation tolerant GaN driver for space applications.

<http://www-group.slac.stanford.edu/ais>