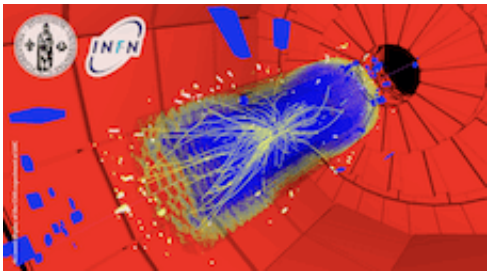

Contribution ID: **39** Type: **Talk**

Time-Resolved Studies of Single-Event-Upset effects in Optical Data Receiver for the First LHC Upgrade Phase of the ATLAS Pixel Detector.

Friday, 8 July 2011 15:40 (20 minutes)

A multi-channel optical receiver board housing a PiN array coupled to an amplifier-and-decoding ASIC designed in 130 nm CMOS process for bi-phase-mark encoded input signals, was exposed to a proton beam of 24 GeV/c momentum together with a reference receiver board containing the same ASIC coupled to an electrical input-signal-source instead. The 40 MHz clock and 40 Mbit/s data signals supplied to the devices under test, were restored directly on both boards and then transmitted back to the counting room for on-line checking of consistency. In the case of a data bit error or a missing clock transition, indicating an occurrence of a SEU, a sequence of time aligned data bits and corresponding clock states were recorded binary and in part as oscilloscope-waveforms for off-line analyses. Measurements were performed using a custom-developed, FPGA-based, DAQ system for input signals covering a certain range of optical and electrical amplitudes. We present results obtained from the latest 2010 run at the CERN irradiation facility, including the SEU cross-section dependence on input signal amplitude, for various types of effects on clock and data consistency, along with the time-resolved structure of the SEU incidents.

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Session Classification: DAY 3

Track Classification: Radiation Effects and Hardness