Contribution ID: **100** Type: **Oral**

Design studies of a low power serial data link for a possible upgrade of the CMS pixel detector

Thursday, 18 September 2008 11:25 (25 minutes)

The material budget inside the sensitive tracking volume is highly dependent on the dissipated power for data transmission. It is therefore important to have a very low power serial data link, that allows to transmit digital data over short distances within the tracking volume. Such a low power ohmic data transmission through micro-twisted transmission lines aims for a transmission speed of 160/320 MHz and allows to concentrate the tracker data to multi gigabit optical data hubs.
For such a future link we need low swing differential drivers and receivers with
PLLs for frequency multipliers and clock recovery. We have implemented in radiation hard layout all the necessary components on a recently submitted 250nm CMOS test chip. After reporting on the experience gained with low power data transmission in the current CMS pixel detector we present the design considerations and first results for this new 160/320 MHz serial link that may work with differential signal levels as low as 10mV.

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Session Classification: TOPICAL 1 - LHC Upgrades