

Serial Powering Characterisation for the CMS Inner Tracker at the High Luminosity LHC

Rudy Ceccarelli, rceccare@cern.ch

The CMS tracking system will be completely replaced in order to operate in the extreme conditions of the High Luminosity LHC. The inner section of the future tracker, referred to as Inner Tracker, will be made of pixel detectors, while the outer section (Outer Tracker) will be made of strip and macro pixel detectors.

In the Inner Tracker silicon sensors will be readout by the CMS Readout Chip (CROC). The chip, built in 65 nm CMOS technology, is able to withstand high radiation doses (500 Mrad) and hit rates (3 GHz/cm^2 on the innermost tracking layer) during operation. Moreover, it must handle an increased sensor granularity ($2500 \mu\text{m}^2$ pixels) and operate at low detection thresholds ($1000 e^-$).

The Inner Tracker will make use of the serial powering scheme to provide the about 60 kW required by thousands of modular units. The Shunt-LDO (SLDO) regulator is the part of the CROC responsible for providing the power by draining a constant current in time, independently of the chip power consumption needs.

Tests performed with Single Chip Cards (SCC), evaluation boards developed with detailed monitoring capabilities, in parallel and serial configurations will be presented, as well as tests on module prototypes.