

The implementation of the power supply system of the CMS silicon strip tracker

Thursday, 6 September 2007 11:25 (25 minutes)

The power supply system of the silicon strip tracker of the CMS experiment provides HV bias and LV power to the 15 thousand silicon modules comprising the detector, arranged into 1944 “power groups” and 256 “control rings”.

Around 1200 power supply modules, disposed on 29 racks, operate in a “hostile” radiation and magnetic field environment, 10 m away from the beam crossing region. They power the detector through ~50 m long custom-designed “Low Impedance” cables, adopting the sensing technique to compensate the voltage drop. Separate board models are deployed for detector power groups and control rings. The required 48V power is provided by AC-DC converters installed on the same racks.

This paper reports the experience with the implementation of the system, which requires a careful study of the rack layout, grounding scheme, power budget, heat dissipation on racks. Comprehensive Quality Assurance and burn-in programs ensure the performance of the system, establishing the protocol, shared with the board’s manufacturer, for acceptance tests and failure detection.

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Session Classification: Topical 2: Detector Power Supply and Distribution 2