



Contribution ID: 30

Type: **Presentation**

RADIATION TOLERANCE ASSURANCE OF TECHNICAL EQUIPMENT IN THE LHC & RADIATION MONITORING FOR TECHNICAL EQUIPMENT AT THE LHC

Wednesday 25 May 2005 09:20 (30 minutes)

In contrast with other accelerators at CERN, a large amount of technical equipment will be located in the LHC tunnel, the underground areas and in the experimental caverns where they will be exposed to radiation. Nearly all these equipment make, to a certain extent, use of commercial microelectronics which is extremely sensitive to radiation damage, both instantaneous damage and cumulative damage. Examples in the TS Department are the electronics for the position sensors of the low beta quadrupoles, the access system, the cooling and ventilation units, the electronics for the electrical distribution, the oxygen deficiency monitors and fire detection systems. The basic effects of radiation on electronic systems and components are well understood because similar problems with radiation are encountered in the aerospace and aviation industry. Since 1998, an efficient and original Radiation Tolerance Assurance approach for the LHC machine has been established. Its aim is to minimise the effects of radiation damage on the LHC performance.

In the LHC tunnel and underground areas, personnel, superconducting magnets, electronic equipment and detectors will be exposed to radiation. This is why there will be four different radiation monitoring systems in the LHC. The RADiation MONitoring (RADMON) system presently developed in the TS/LEA group has been designed to provide an early warning as the radiation levels at the location of the electronic equipment in the tunnel, underground areas and experimental caverns increase.

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Session Classification: Session 5

Track Classification: LHC and Experiments