

ON-LINE RADIATION TEST FACILITY FOR INDUSTRIAL EQUIPMENT NEEDED FOR THE LARGE HADRON COLLIDER AT CERN

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The future Large Hadron Collider to be built at CERN will use superconducting magnets cooled down to 1.2 K. To preserve the superconductivity, the energy deposition resulting from beam losses must be kept at a minimum level. As a consequence, the radiation doses will also be low; the absorbed dose levels in equipment located outside the cryostat, in the LHC tunnel, are calculated to be of the order of 1 to 10 Gy per year. At such dose levels, no major radiation-damage problems are to be expected, and the possibility of installing Commercial Off The Shelf (COTS) electronic equipment in the LHC tunnel along the accelerator is considered. To this purpose, industrial electronic equipment and circuits have to be qualified and tested against radiation to insure their long term stability and reliability. An on-line radiation test facility has been setup at the CERN Super Proton Synchrotron (SPS) and a program of on-line tests for electronic equipment is ongoing. Equipment tested includes Industrial Programmable Logic Controllers (PLCs) from several manufacturers, standard VME modules, Fieldbuses like Profibus, WorldFIP and CAN, various electronic cards, power converter equipment and cryogenic components. The irradiation is taking place in one of the target areas of the CERN SPS. The radiation is typical of a proton accelerator; it includes mainly gammas and neutrons, plus some high-energy particles.