

Annealing of Superconducting Magnet Protection Diodes for the LHC After Irradiation at Liquid Helium Temperatures,

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TUM** - Within the framework of the Large Hadron Collider (LHC) R&D programme, CERN and the Department of Physics E21 of the Technical University Munich have established a collaboration to carry out irradiation experiments at liquid helium temperatures on epitaxial diodes for the superconducting magnet protection. A large portion of the degradation of the diodes in forward voltage caused by irradiation can be recovered by thermal annealing. Two sets of small diode samples of 10 mm wafer diameter were submitted to a dose of up to 30 kGy and a neutron fluence up to $6 \cdot 10^{14}$ n/cm² at liquid helium temperature. The degradation of the electrical characteristics was measured. To determine the minimum annealing temperature one set of diode samples was stepwise warmed up to about 250 K and, at each step, the recovery in forward voltage monitored. The second set of diode samples was thermally annealed for different time intervals at about 100 K and 200 K to determine the minimum annealing time interval.

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