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Defect Spectroscopy on Proton Irradiated 4H Silicon Carbide Devices

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Silicon Carbide (SiC) has gained attention in recent years for a number of benefits as a sensor material, especially its low leakage current in harsh radiation fields and at elevated temperatures. This study focuses on investigating intrinsic and radiation-induced defects in n-type 4H-SiC devices. The sensors studied were manufactured by IMB-CNM, with a 5µm or 50µm thick epitaxial layer on top of a 350µm thick 4H-SiC substrate. The samples were irradiated with 23GeV protons at the CERN IRRAD facility to 1E+11 to 1E+15 p/cm². TSC and DLTS measurements were performed in the temperature range of 20K to 350K. The presented results include IV and CV measurements taken before and after irradiation, as well as the defect parameters obtained from TSC and DLTS measurements.

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