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The Cryogenic Transient Current Technique (C-TCT) measurement setup of CERN RD39 Collaboration

The CERN RD39 Collaboration has constructed Transient Current Technique (TCT) measurement setup, which is capable to operate below liquid nitrogen temperatures. By analyzing the current transients, it is possible to extract the full depletion voltage, effective trapping time, electric field distribution and the sign of the space charge in the silicon bulk. Our results show that the effective space charge and trapping can be manipulated by charge injection and temperature. This might allow significantly higher Charge Collection Efficiency (CCE) compared to the detectors operating under normal reverse bias and at temperatures from 0 ◦ to -30◦ C.

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