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TCAD Simulation of the HVCMOS sensor for the MIDAS personal active dosimeter

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The MIDAS device is an active dosimeter for application in the mixed field of space environment under development. It will use active pixel sensors for the measurement of energy depositions by charged particle tracks in Si pixel layers covering five out of six faces of a plastic scintillator cube. The Si active pixel sensors are based on commercial High Voltage CMOS technology which has proven its radiation hardness in the context of the upgrade of the HEP experiments for the high-luminosity LHC. The dynamic range of the charge signal induced by Galactic Cosmic Rays makes necessary the study of the electrical behavior and especially of the signal formation process in the pixel sensor. It is performed with the aid of the Sentaurus TCAD tools suite. We will present results for all the parameters affecting the electrical behavior of the pixel: Depletion region, leakage current, capacitances, transient signals induced by the passage of charged particles.

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