

Improvements of DePFET sensor technology

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The DePFET is an active pixel sensor first introduced in 1987 (Kemmer&Lutz NIMA 1987) and is utilized in and suggested for experiments in astrophysics, planetary exploration as well as particle physics. The DePFET is essentially a pMOSFET built on a high resistive, fully depleted bulk. A deep-n implant beneath the MOS-gate forms a positive potential. Electrons are collected in this “internal gate” and modulate the transistors conductivity. Geometry and operational parameters influence the g_q i.e. the DePFETs “charge gain”. Recently we developed a new technology that offers a significant increase of signal to noise ratio. With respect to simulation results, these super g_q DePFETs will have a charge gain about 3-4 time larger than standard DePFET devices without increasing the DePFETs effective noise. A test production is currently ongoing. Herein we will present the new Technology and discuss the expected improvements.

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