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Monolithic active pixel sensor for ionizing radiation using 180nm HV-SOI process

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A new type of sensor for ionizing radiation based on Partially Depleted High Voltage SOI technology (PD-SOI) has been developed.
Similar to exisiting SOI based monolithic active pixel sensors (MAPS) a buried silicon oxide inter-dielectric (BOX) layer is used to separate the CMOS electronics from the handle wafer which is used as a depleted charge collection layer. However, compared with these SOI MAPS that suffer from radiation damage in the buried oxide (back gate effect) and parasitic coupling through the BOX layer, this technology offers an additional isolation by an non depleted implant between BOX and the active circuitry. This is a special feature of the PD-SOI process. Therefore we see a high potential with this technology to implement fast and radiation hard MAPS. The concept and measurement results from a first prototype are presented.

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