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SpacePix Radiation Monitor: SoI MAPS Detector for Space Radiation Monitoring

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Space radiation presents a risk to both unmanned spacecraft systems and human exploration of the Solar System. Thanks to advances in semiconductor technologies, it is possible to design and manufacture low-power pixel detector ASICs with backside pulse digitization, which allows a large dynamic range. The SpacePix2 is a radiation detection ASIC designed for radiation sensing in an aerospace environment. It is a monolithic pixelated detector with a matrix of 64x64 pixels with 60 µm pitch developed in a 180 nm PDSoI technology. It is suitable for electron, proton and heavy ion energy deposition measurement.
The SXRM is a compact lightweight multi-layer particle telescope detector, where detection layers of SpacePix2 ASICs are interleaved with a copper ionization energy absorber. It allows sampling of dE/dx losses in multiple layers, and by using pattern recognition techniques (clustering, topologies), it enables particle identification, its energy estimation and reconstruction of incoming particle trajectory.

Designed for charged particle energy and species determination, reconstruction algorithms allow the determination of particle track parameters.

The SXRM was launched on Janurary 13, 2022 on the Czech technological nanosatellite VZLUSAT-2 as a part of the 2SD radiation monitoring instrument. First data are expected in spring 2022.

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