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## HV-CMOS Sensors for the Mu3e Experiment Searching for Lepton-Flavor Violation

Mu3e is going to search for the lepton-flavor violating decay of a positive muon into two positrons and an electron. This decay is possible within the Standard Model, but it is suppressed to  $O(10^{-50})$ . However, there is a number of suggested extensions of the Standard Model, introducing particles that render this decay path much more likely. Therefore, any observation of this decay would be proof of physics beyond the Standard Model. Unfortunately, there are background processes that could be mistaken for the wanted process, e.g. the decay of a muon to three electrons and two neutrinos or the superposition of several muon decays.

Mu3e is currently under construction at Paul-Scherrer-Institut (Switzerland). It will be able to analyze the decays of 109 muons per second, avoid pileup and detect the emerging particles with a sufficient momentum resolution, so that no neutrino can escape unnoticed. This requires a time resolution  $< 100$  ps, a vertex resolution of  $< 200$   $\mu\text{m}$  and a momentum resolution  $< 0.5$  MeV/c.

These requirements have led to the design of a detector consisting of an inner pixel detector, a layer of scintillating fibers and an outer pixel layer. It is operated in a magnetic field to bend the particle's trajectories. This barrel-shaped detector is combined with similar adjacent detectors, tracing the recurling particles. For optimal momentum resolution, the particles have to pass the detector several times, which limits the material budget to the absolute minimum.

Several iterations of monolithic active HV-CMOS chips for the pixel detector have been designed and produced to fulfill these requirements. They are called MuPix. These approximately  $2 \times 2$  cm<sup>2</sup> large sensors are thinned to less than 100  $\mu\text{m}$  and combined in modules to form all layers of pixel detectors in Mu3e. 256 x 250 pixels per sensor with sensitivity close to 100% record the signals, smart electronics care for excellent time resolution and three gigabit links per sensor stream the encoded information out.

We present the status of the latest MuPix sensor –MuPix11 –in the context of the Mu3e experiment.

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