ID de Contribution: **102** Type: **12mOral**

Developments of a 25 µm pitch hybrid pixel detector for photon science

lundi 18 novembre 2024 17:10 (17 minutes)

The MÖNCH detector is a charge integrating prototype Hybrid Pixel Sensor with 25 µm pixel pitch. With low noise pixel architectures and the charge sharing effect, the position of the impinging photon can be interpolated into virtual sub-pixels enabling high spatial resolution. The small pixel pitch also offers excellent native resolution with high frame-rates. The MÖNCH detector has already demonstrated its capabilities in several pilot experiments with various types of sensors (*i.e.* LGADs, standard Si sensors, High-Z materials) covering a very broad range of photon energies.

Using the characterisation results of 19 different pixel designs in MÖNCH0.4 (1cm²), and from the performance of MÖNCH0.3 (single design, 1cm²), we have designed a new prototype: MÖNCH0.5 (4x4 mm²) featuring 6 pixel designs and an optimised analogue readout chain.

We will present the path towards the design of our current prototype accompanied with the first test results in preparation to future pilot experiments. The obtained results will support the scaling-up towards a full-size MÖNCH1.0 detector (~3 x 2 cm²).

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Classification de Session: Photon science applications

Classification de thématique: Photon science applications