

Applications of monolithic CMOS pixel sensor to medical physics

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In recent years, CMOS silicon pixel detectors have seen significant advancements and a widespread usage across various physics fields, allowing for significant improvements of the particle detection technologies. One relevant example is the ALPIDE chip, which is a CMOS Monolithic Active Pixel Sensor developed for the upgrade of the Inner Tracking System of the ALICE experiment at the LHC.

On top of its excellent capabilities for high-energy particle physics, its excellent spatial resolution and charged-particle detection efficiency, very limited noise and fake-hit rate, and reduced sensitivity to photons make it suited for several applications in medical physics.

In this contribution we will show recent developments for two applications in this field being currently investigated. In particular, we will discuss the concept of a Compton chamber using as scatterer element multiple stacks of ALPIDE chip, to cover a large enough sensitive volume, to be used for the online monitoring of hadrontherapy proton or ion beams. We will also report on the perspectives for the development of an intraoperative probe containing an ALPIDE chip as sensitive element, with online imaging capabilities, to be exploited in radioguided surgery in association to beta-emitting radiotracers.

Category

Experiment

Collaboration

ALICE

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