

A fast monolithic pixel detector in a SiGe Bi-CMOS process

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The TT-PET collaboration is developing a new generation of fast, low noise and low power-consumption monolithic silicon detector in SiGe Bi-CMOS technology.

The target of this R&D is to produce a 100 μ m thick monolithic detector, with a time resolution better than 100ps for minimum ionizing particles, 1mm² readout pads and a time digitization at 20ps level. This performance will be achieved with an overall power consumption of less than 20 mW/cm².

A first application of this detector will be the development of a silicon-based TOF-PET scanner with 30ps time resolution for 511 keV photons.

The results of testbeam measurements using discrete component electronics, as well as the preliminary lab measurements on a monolithic chip realised with the SG13S IHP process will be presented.

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