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TITLE OF THE TECHNOLOGY

Fast integrated SiPM readout electronics with high dynamic range

FUNCTION

Develop integrated readout electronics of SiPM for high performance medical imaging (TOF-PET, Gammagraphy, etc) and for high-energy physics and astronomy/astrophysics experiments, with both high dynamic range and minimal time resolution.

ABSTRACT/DESCRIPTION (no more than 700 characters, spaces included)

Development of Application Specific Circuits (ASICs) for medical imaging and HEP physics experiments based on fast solid state low light level photosensors, specially on the SiPM. The technology is focused in providing simultaneously high speed digitization (up to 3 GS/s) and large dynamic range (up to 16 bits). A time resolution better than 100 ps is also pursued for TOF-PET. Final goal is to integrate the readout electronics, including digitization, in a low cost ASIC technology.

TYPE: (expertise, SW, technology, process, packaging/integration, others)

Expertise in ASIC design.

Technology as ASIC IP blocks?

FEATURES (targeted / achieved)

Partly achieved (low noise preamplification, high dynamic range) in the framework of particle and astroparticle physics experiments. Specific functionalities are to be achieved.

PURPOSE / OBJECTIVES

Develop ASIC know how for the described application and maybe an IP library in a low cost technology.

TECHNOLOGY STAGE (EX.: R&D, prototype, available, ready for licensing. patented technology...)

R&D // Prototyping

APPLICATION DOMAINS (as applicable for this specific item)
EX.: medical imaging, radiation therapy dosimetry, high-energy physics, astronomy/astrophysics, material analysis, systems for radiation detection and monitoring.

Medical imaging, high-energy physics, astronomy/astrophysics

ADVANTAGES

Develop a readout in a low cost ASIC technology for SiPM, with both large dynamic range and fast digitazation (or time resolution)

LIMITATIONS

Not strongly needed for applications where there is not need to improve the performance of the existing electronics or where the cost/reliability is not and issue.