Contribution ID: **8** Type: **Invited**

A picosecond avalanche detector in SiGe BiCMOS

Tuesday, 14 March 2023 14:55 (30 minutes)

The MONOLITH ERC Advanced project aims at producing a monolithic silicon pixel ASIC with picosecond-level time stamping by using fast SiGe BiCMOS electronics and a novel sensor concept, the Picosecond Avalanche Detector (PicoAD).
The PicoAD uses a multi-PN junction to engineer the electric field and produce a continuous gain layer deep in the sensor volume, generating a thin absorption layer that limits the impact of charge collection noise on the timing performance. The result is an ultra-fast current signal with low intrinsic jitter in a full fill factor highly granular monolithic detector.
In addition to that, the manufacturing process of the PicoAD makes it extremely versatile to enhance the timing capability of existing sensor designs.
A proof-of-concept ASIC prototype not yet optimized for timing confirms that the PicoAD principle works according to simulations. Testbeam measurements show that the prototype is fully efficient and achieves time resolutions down to 24ps.
An optimization of the sensor design and the development of new fast, low-power electronic are the next steps to achieve the picosecond time resolution target.

Primary author: PAOLOZZI, Lorenzo

Presenter: PAOLOZZI, Lorenzo

Session Classification: Tracking

Track Classification: Tracking