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MONOLITH - picosecond time stamping capabilities in fully monolithic highly granular silicon pixel detectors

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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. The result is an ultra-fast current signal with low intrinsic jitter in a full fill factor highly granular monolithic detector.

A proof-of-concept ASIC prototype confirms that the PicoAD principle works according to simulations. Testbeam measurements show that the prototype is fully efficient and achieves time resolutions down to 18ps.

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