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Picosec Micromegas: a fast-timing gaseous detector for MIPs

Picosec is a novel micropattern gaseous detector (MPGD) proposed by the RD51 collaboration to overcome the limitations of classical MPGDs in terms of timing performance. The concept is based on detecting Cherenkov light emitted by an impinging particle in a proper radiator. A photocathode converts such light into electrons, and a double amplification stage MicroMegas detector detects them. The Picosec RD51 collaboration has already demonstrated the standalone functionality of this technology, reaching an excellent time resolution of 24 ps.
This technology opens the timing sector on tens of picoseconds to gaseous detectors, making them competitive with other fast-timing technologies but with the traits of MPGD. We aim to build and develop a robust and reliable standard for this detector technology capable of operating in next-generation facilities. This goal can be reached by searching for radiation-hard photocathodes, new eco-friendly gas mixtures and robust Cherenkov radiators.
In particular, the Picosec technology is currently proposed for the Muon Collider detector as a muon timing station where it can contribute to the enhancement of the quality of the muon tracks.

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