



SPEAKER: Eraldo Oliveri
TITLE: **Charged particle timing in the sub-50 picosecond regime with MicroMegas based detector**
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ABSTRACT

Time resolution of few tens of picoseconds is what the future physics at the HL-LHC require for vertex reconstruction, pile-up discrimination and background subtraction. Driven by this motivation, various groups are performing R&D in different detector technologies. Very often, time resolution come together with other requirements: high rates and radiation hardness are just two examples.

The seminar will describe a new detector concept, namely Picosec, which is aiming at fulfilling these requirements using micro pattern gaseous detector (MPGD) technologies and their flexibility. The detector is made of a thin drift Micromegas coupled to a Cerenkov-radiator front window and to a semi-transparent UV photocathode. Single-photoelectron response better than 100ps has been measured with a femtosecond UV laser at IRAMIS. Time resolution with minimum ionizing particles better than 50ps has been measured at the CERN SPS extraction lines.

The excellent results achieved represent the proof of principle of the Picosec concept. Numerous topics are currently under study in view of developments of detectors for experiments and applications. Photocathodes and its lifetime, multichannel readout and large active area, robustness, front end electronics, high rate and so on so forth.

Achieved results, preliminary outcome of the ongoing activities and future (photocathodes in particular) research plans will be presented. The seminar will end with a brief summary of the first "precise timing workshop" organized at CERN in 2017 by RD51 and the Picosec collaboration. Going through different technologies and proposed solutions the workshop touched various and common aspects as detector, photocathodes, electronics, analysis and infrastructures.