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Progress in the development of Fast Timing Micro-pattern Gaseous Detectors

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Advances in photo-lithographic techniques during the last twenty years have led to the development of micro-pattern gaseous detectors (MPGD). Their main features include high rate capability and radiation hardness, excellent spatial resolution, good time resolution, reduced radiation length and possible flexible geometries. In recent years the further development of MPGDs concentrated on using resistive materials to build compact spark-protected detectors. The use of resistive materials also opened the possibility to make electrically transparent structures with external signal pick-up. This allowed for a new idea to improve the time resolution through a multi-layered detector, consisting of alternating drift and amplification regions, where the fastest signal determines the detection time. This so-called Fast Timing MPGD (FTM) was firstly introduced by Rui de Oliveira et al. in 2015 [1] and aims to combine both the high spatial resolution and the high rate capability of a MPGD with a high time resolution of the order of 300ps. Here, we introduce the design of a new single-layer prototype to test the gain of the amplification structure. Preliminary results on the detector characterization will be shown.

[1] R. De Oliveira, M. Maggi and S. Sharma, "A novel fast timing micropattern gaseous detector: FTM", CERN-OPEN-2015-002; arXiv:1503.05330v1 [physics.ins-det]

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