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Development and performance of a fast timing micro-pattern gaseous detector (FTM) for future collider experiments and medical diagnostics

The fast timing MPGD is a micro-pattern gaseous detector conceived for achieving sub-nanosecond time resolution while maintaining the ability to instrument large areas in high-rate environments; applications of such technology are perspected in high-energy physics experiments at future colliders and medical diagnostics with time-of-flight methods. This work is a systematic study carried on a small-size FTM prototype on the performance of GEM foils coated with resistive DLC films, whose performance has been tested with several gas mixtures and compared with the results obtained on conductive foils. The results confirm the development of ever refined coating and etching technologies of resistive laminates is essential for the FTM operation. The ongoing progress towards the improvement of the fast timing principle is also shown, along with the development of a fast time-tagger setup for beam tests.

Primary experiment

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