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## The micro-RWELL detector for the phase-2 upgrade of the LHCb Muon system

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The micro-RWELL is a single amplification stage resistive MPGD. The device is realized with a copper-clad polyimide foil micro-patterned with a well matrix coupled with a readout PCB through a Diamond-Like-Carbon (DLC) resistive film ( $10\div 100$  MOhm/square).

The detector is proposed for several applications in HEP that require fast and efficient triggering in harsh environment (LHCb muon-upgrade), low mass fine tracking (FCC-ee, CepC, SCTF) or high granularity imaging for hadron calorimeter applications (Muon collider).

For the phase-2 upgrade of the LHCb experiment, proposed for LHC Run-5, the excellent performance of the current muon detector will need to be maintained at 40 times pile-up level experienced during Run-2.

Requirements are especially challenging for the innermost regions of the muon stations, where detectors with rate capability of few MHz/cm<sup>2</sup> and capable to stand an integrated charge up to  $\sim 10$  C/cm<sup>2</sup> are needed.

In this framework an intense optimization program of the micro-RWELL has been launched in the last year, together with a technology transfer to the industry operating in the PCB field.

In order to fulfill the requirements, a new layout of the detector with a very dense current evacuation grid of the DLC has been designed.

The detector, co-produced by CERN-EP-DT-MPT Workshop and ELTOS Company, has been characterized in terms of rate capability exploiting a high intensity 5.9 keV X-ray gun with a spot size ( $10\div 50$  mm diameter) larger than the DLC grounding-pitch. A rate capability exceeding 10 MHz/cm<sup>2</sup> has been achieved, in agreement with previous results obtained with m.i.p. at PSI.

A long term stability test is in progress: a charge of about 100mC/cm<sup>2</sup> has been integrated over a period of about 80 days. The test will continue with the goal to integrate about 1 C/cm<sup>2</sup> in one year, while a slice test of the detector is under preparation.

### Collaboration

LHCb

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