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First industrial production of large area Micromegas by ELVIA: status, applications and perspectives

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A know-how transfer was initiated in 2014 with the ELVIA company for the production of 50x50 cm², 2D resistive Micromegas. The project emerged after the successful test of such detectors equipped with the “genetic multiplexing” layout which reduces the number of electronics channels by a factor of 17 (and up to 30). The strong cost reduction allowed by these detectors made then possible the design of several, high-precision imaging instruments using the interactions of cosmic muons with matter. The number of such detectors to be built (>30) was too large for the CERN capabilities, and the ELVIA company was contacted for the manufacturing. In total, 36 such detectors were built (9m²), 24 being made by ELVIA.

We will report here on the different aspects of this know-how transfer and large scale production, from the PCB manufacturing to the final performance of these detectors, and including the delicate topic of resistive Kapton films. All these detectors are now operational in various setups, including 2 muon imagers of unprecedented resolution (deviation mode) and 3 muon telescopes used within the ScanPyramids mission (the performance and the results of these 3 telescopes will be discussed in a dedicated talk). These muon instruments elicited the interests of several industrials, and a new funded project has started with the aim to build several large telescopes, corresponding to the additional production of at least 50 detectors.

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