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Construction and Performance Studies of a Micromegas Detector with a Pad Readout Geometry

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We report on the design and the performance of a prototype detector based on Micromegas technology with a pad readout geometry. The prototype detector consists of 500 pads covering an active area 10x10 cm. Each pad has a size of 6x4 mm and is connected to an individual readout channel. The design of this prototype and its associated readout infrastructure was developed such, that it can be easily adapted for large size detector concepts. In addition, two alternative implementations of a spark-resistant insulating layer on top of the readout pads of the prototype detector have been implemented and tested to optimize the charge-up behavior of the detector under high rates. The corresponding concepts have never been implemented for Micromegas detectors before. The aim of our prototype detector is to provide a solution for the coordinate matching ambiguity of two orthogonal one-dimensional precision tracking chambers under high rates.

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