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TRD detector development for CBM experiment

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A TRD prototype based on a single multiwire proportional chamber coupled with a small drift region was developed for the most inner part of the CBM-TRD subdetector. It preserves the same gas thickness for transition radiation absorption as the small size double-sided prototype for which an extrapolated pion efficiency of ~1% for a six layers configuration was obtained and fulfills the requirement of high geometrical efficiency of the CBM-TRD stations. With the aim to access the position information in both coordinates of the readout electrode pad-plane (across and along the pads) with a single TRD layer, the original rectangular pads of the read-out electrode were split diagonally, each triangular pad being readout separately. A new Fast Analog Signal Processor (FASP) for pad signal processing has been developed. The detectors were tested with a mixed electron/pion beam of 1-10 GeV/c momenta at CERN PS. A pion efficiency of 1.18% for a six layer configuration based on such an architecture was obtained. The performance in two dimensional position resolution is reported. Based on these results, the geometry of the most inner zone of the first CBM-TRD station was designed.

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