

# Novel triple-GEM design for CMS-ME0 detector and preliminary performances

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In the framework of the HL-LHC project, the upgrade of the CMS Muon System foresees the installation of three new muon stations based on the GEM technology, named as GE1/1, GE2/1 and ME0 detectors. The CMS GEM Group has developed a novel construction design of GE1/1 triple-GEM detectors; in particular, a new self-stretching technique has been introduced to mechanically stretch the GEM foils without using spacer grids or glue inside the gas volume. As has been observed, the PCB boards get deformed under the internal gas overpressure, introducing irregularities in the planarity of the detector, which could potentially affect the uniformity of the detector performance. New solutions and design upgrades have been implemented to prevent such effects in future GE2/1 and ME0 upgrade projects. We will focus in particular on the novel design solutions based on the PCB pillars, which the group adopted for realization of the latter projects, and their impact on the performance of the detector.

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