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Final design of the readout system for Triple-GEM detectors for the CMS forward muon upgrade

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In this contribution we will present the readout system being designed for triple-GEM detectors that should be installed in 2019-2020 in the CMS muon endcap system for the LHC high luminosity phase. Beginning of 2017, 10 triple-GEM detectors equipped with VFAT2 front-end chips and readout system version 2 have been for the first time installed in CMS. Lessons learnt from this so-called “slice test” has led to a more robust version, V3, the final version.

The readout system being designed takes full advantage of current generic developments introduced for the LHC upgrades: CTP7 AMC boards host in micro-TCA crates for the off-detector electronics, the Versatile Link with the GBT chipset to link the front-end electronics to the micro-TCA boards. In addition, the CMS AMC13 micro-TCA board will be used to interface the back-end electronics to the central CMS DAQ system. Finally, the FEAST DC-DC converters are used to power the on-detector electronics.

The triple-GEM detectors are read-out by a new front-end chip, the VFAT3 running at 320MHz, compatible with the GBT chipset. In addition, a few hardware components have been developed specifically for this project: the GEM Electronic Board (GEB) and the Opto-Hybrid board. The Opto-Hybrid is a small (typically 10 x 20 cm²) mezzanine equipped with a Xilinx Virtex6 FPGA and the GBT chipsets.

We will report on the latest status of the whole readout system with special focus on the changes compared to the version 2, on slice test results and first tests of the final version.

Description

VFAT2 chip

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Country

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Minioral

Yes

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