

To whom it may concern

I'm writing to confirm the contributions made by the Chinese cluster (University of Science and Technology of China, Shan Dong University and Shanghai Jiaotong University) to the upgrade of the ATLAS Muon Spectrometer.

In order to fully exploit the potential of the LHC accelerator, where Higgs boson was discovered, a high luminosity phase is planned, HL-LHC. The detector system of the ATLAS experiment will go through an upgrade accordingly (Phase-II upgrade) to cope with the increased instantaneous luminosity. As the project leader of the muon system upgrade, I am glad to see that most of the sub-systems are coming to the final design stages, after years of great efforts made by the collaborating institutes. Among them, the Chinese Cluster contributed a lot to the RPC trigger system and the TDC ASIC of the MDT system. In addition, the USTC (University of Science and Technology of China) group from the cluster has explored an emerging and challenging Micro-pattern gaseous detector (MPGD) technology for tagging muons in the high-eta region of the ATLAS experiment.

The Chinese Cluster brought fresh blood to the RPC trigger detector system. They proposed and demonstrated the two-end readout method of the detector, together with the design of the honeycomb-based readout panel. They have successfully assembled and tested the full-size RPC detector with qualified performance. A local RPC assembly site is being established with corresponding QA&QC procedures which indicates that they are getting ready for the real production for the upgrade.

The USTC group joined the MDT TDC ASIC design. After the design, tape-out and extensively test of three versions of prototypes, all the required performances have been achieved with low readout latency, low power consumption and a flexible data interface. This is an important contribution to the upgrade of the MDT electronics.

It is worth nothing that in addition to the above upgrade work, the USTC group has carried out extensive R&D work for the ATLAS high-eta muon tagger which the ATLAS collaboration had once considered part of the ATLAS muon phase II upgrade, but finally decided to remove it from the upgrade project to concentrate on the core of the detector upgrade required for the HL-LHC. The high-eta muon tagger is, however, left open as a potential future upgrade of the ATLAS muon system beyond the phase II upgrade. The USTC group proposed a high-rate and compact uRWELL detector concept for the high-eta muon tagger and developed critical techniques for manufacturing the detector including a DLC resistive coating technique and a large-area fast grounding technique. They also developed various prototypes for the detector in collaboration with INFN and CERN to validate the detector concept and demonstrate its performance. A high rate capability, good position resolution and high

efficiency have been achieved with the detector prototypes, which constitute an important contribution to the R&D of the high-eta muon tagger.

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