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The Trigger Readout Electronics for the Phase-1 Upgrade of the ATLAS Liquid-Argon Calorimeters

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The upgrade of the Large Hadron Collider (LHC) scheduled for the shut-down period of 2018-2019 (Phase-I upgrade), will increase the instantaneous luminosity to about three times the design value. Since the current ATLAS trigger system does not allow a corresponding increase of the trigger rate, an improvement of the trigger system is required.

The new trigger signals from the ATLAS Liquid Argon Calorimeter will be arranged in 34000 so-called Super Cells which achieve 5-10 times better granularity than the current system; this improves the background rejection capabilities through more precise energy measurements, and the use of shower shapes to discriminate electrons and photons from jets. The new system will process the signal of the Super Cells at every LHC bunch-crossing at 12-bit precision and a frequency of 40 MHz. The data will be transmitted to the back-end using a custom serializer and optical converter with 5.12 Gb/s. To verify the full functionality, a demonstrator set-up has been installed on the ATLAS detector and operated during the LHC Run-2 of the LHC.

The talk will give a status on hardware developments towards the final design readout system, including the performance of the newly developed ASICs. Their radiation tolerance, the performance of the prototype boards, results of the high-speed link test with the prototypes and the performance of the demonstrator with collision data will be also reported.

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