

# Electronics Development for the ATLAS Liquid Argon Calorimeter Trigger and Readout for Future LHC Running

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The upgrade of the LHC will provide 7 times greater instantaneous and total luminosities than assumed in the original design of the ATLAS Liquid Argon (LAr) Calorimeters. Radiation tolerance criteria and an improved trigger system with higher acceptance rate and longer latency require an upgrade of the LAr readout electronics. In the first upgrade phase in 2019-2020, a trigger readout with up to 10 times higher granularity will be implemented. This allows an improved reconstruction of electromagnetic and hadronic showers and will reduce the background for electron, photon and energy-flow signals at the first trigger level. The analog and digital signal processing components are currently in their final design stages and a fully functional demonstrator system is operated and tested on the LAr Calorimeters. In a second upgrade stage in 2024-2026, the readout of all 183,000 LAr Calorimeter cells will be performed without trigger selection at 40 MHz sampling rate and 16 bit dynamic range. Calibrated energies of all cells will be available at the second trigger level operating at 1 MHz, in order to further mitigate pile-up effects in energy reconstruction. Radiation tolerant, low-power front-end electronics optimized for high pile-up conditions is currently being developed, including pre-amplifier, ADC and serializer components in 65-180 nm technology. This talk will give an overview of the future LAr readout electronics and present research results from the two upgrade programs.

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