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ATLAS LAr Calorimeter Electronics Upgrade for the HL-LHC

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After the the LHC high-luminosity upgrade in 2024-2026 the detectors will need to operate at luminosities about 5-7 times larger than assumed in their original design. The current readout of the ATLAS Liquid Argon (LAr) Calorimeters was not designed for this environment and the expected total radiation doses are beyond the anticipated lifetime of the current front-end electronics. As a result, a replacement of the front and back-end electronics for all 182k channels is planned. The new low-power electronics will capture the ~400 ns detector pulses with a dynamic range of 16-bits. Among the technologies under evaluation for this upgrade are a pre-amplifier, shaper and an ADC all developed in 65 nm CMOS technology. The design of a radiation-hard, 14-bit ADC operating at 40 MHz will be presented. Results from performance and simulation of the calorimeter readout system and results from design studies and first tests of the components will be shown.

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