

# Upgrade of Front End Boards for ATLAS Tile Calorimeter

Chris Meyer

Advised by Professor Mark Oreglia

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The current DAQ system for the Tile Calorimeter in ATLAS runs using a 10-bit Front End ADC. For the sLHC upgrade replacing these boards with a 12-bit equivalent is being pursued and needs testing. It will be my task to use the existing Front End boards and attach external shapers, sending the output to the new 12-bit ADC evaluation boards, then storing the data on a VMS DAQ system. Once stored the data will be looked at through hi and lo gain channels, comparing the measurement to the known incoming signal and determining the optimum point of overlap. The 12-bit ADC noise levels will also be compared to that of the 10-bit units to determine which aspects might suffer a performance hit from the upgrade. I will also look into the shaper system, changing the width and examining the benefits of using an active shaper vs. a passive shaper.

This work is necessary because of the increased luminosity the sLHC will be running at. It will introduce a more dynamic range and the ability to process data at higher speeds, both of which are necessary for studying jet physics at the higher rates the Tile Calorimeter will be exposed to.

In Summary:

- Compare output noise of 12-bit ADC versus 10-bit ADC.
- Examine shapper characteristics. Active versus Passive, shaping width.
- Find optimum point of overlap for the dual-gain system (hi and lo).