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Measuring electronics latencies in MINOS with Auxiliary Detectors

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The MINOS experiment uses two detectors separated by 734km to study neutrino oscillations between Fermilab and the Soudan Underground Laboratory. MINOS is also conducting a neutrino time of flight measurement between the two detectors. As a part of an improved technique, we have installed two identical pairs of small Auxiliary Detectors (AD) near both MINOS detectors to calibrate the difference of timing systems of the Near and Far Detector. The AD's, made using 'MINOS technology', comprise scintillator strips read out by wavelength-shifting fibers and 16-anode PMT's. The AD's are placed to observe muons from events registered in the MINOS detectors. AD hits are independently time-stamped using a CAMAC TDC and Brilliant Instruments Time Interval Analyzer.
The comparison between time stamps in AD's and both MINOS detectors provide the latency measurement of read out electronics.

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