Installation and Upgrades of Front End Electronics for the New Small Wheel

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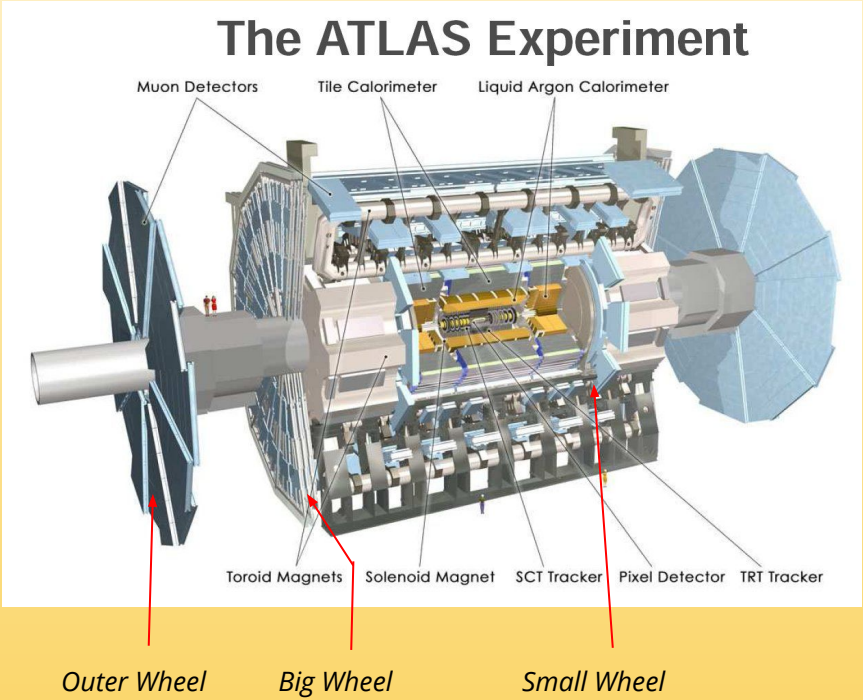
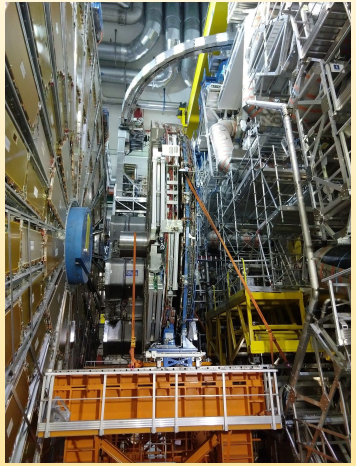
Experiment: ATLAS

- The ATLAS experiment is a general-purpose particle physics experiment which seeks to search for new physics and test the predictions of the Standard Model.
- The ATLAS detector is currently undergoing upgrades and renovations

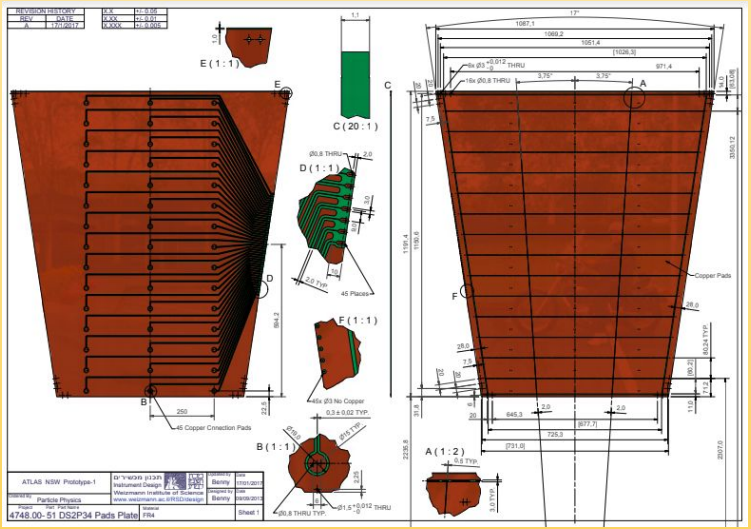


My Project

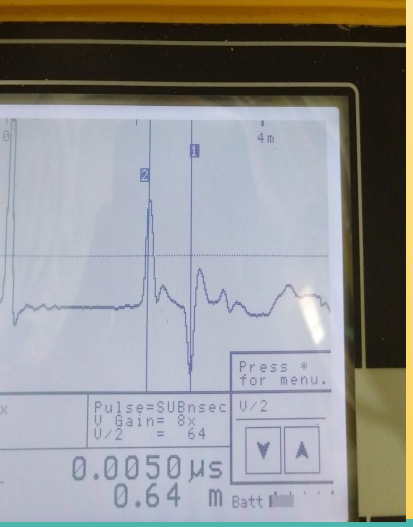
Current Small Wheel:



Pad and Cable Length Diagram:



- The New Small Wheel is one of the pieces of the ATLAS detector which is being upgraded
- Each piece must be properly calibrated.
- Because we are working on the nanosecond scale, this includes the time delay that comes from the cable length.
- Each detector component in the Small-Strip Thin Gap Chambers (sTGC) has a different cable length, meaning that we need a way to effectively predict the time delay without doing individual measurements.

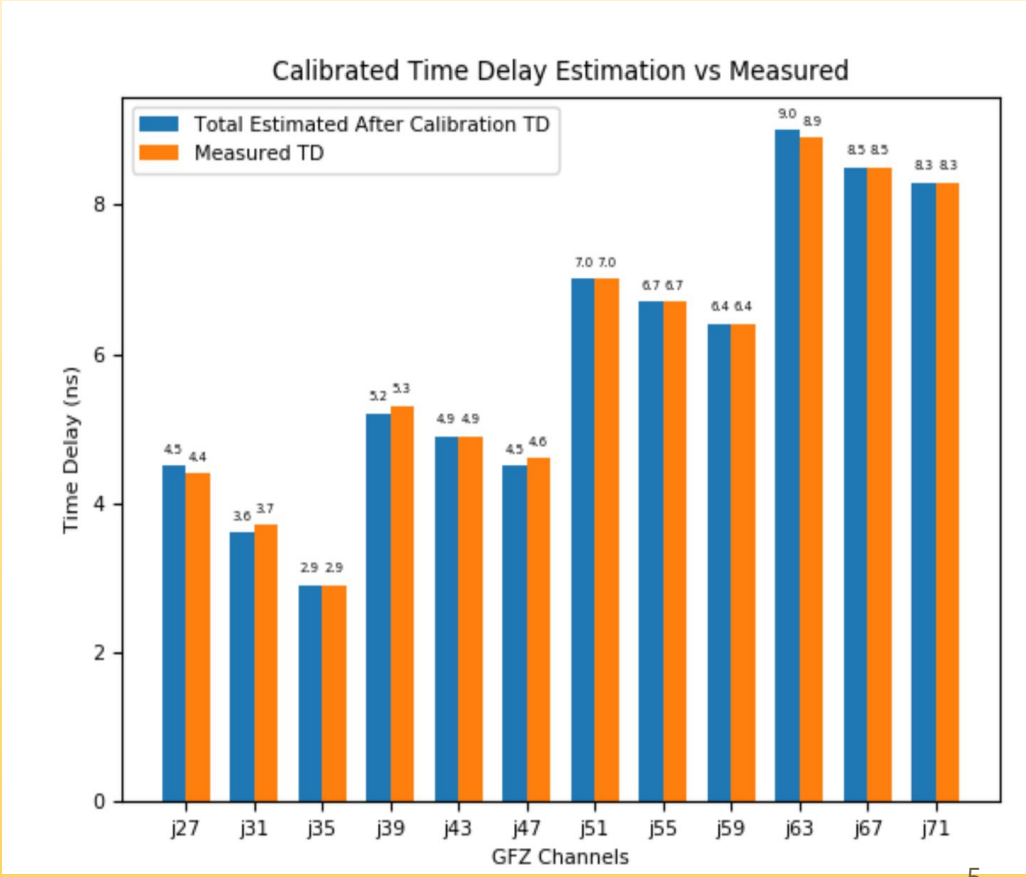


Current Progress

- The Time Domain Reflectometer (TDR) works by sending an electric pulse down a wire and measures the time it takes for any reflections to return.
- First measurements of true time delay have been made using a Time Delay Reflectometer.
- The list of cable lengths to channel number and time delay predictions has nearly been tabulated.
- Currently writing C++ class for fast and easy querying
- Managed to match prediction to data after boosting
- Preliminary results have been reported in the weekly sTGC meeting

Future Work

- Further improve upon predictions to better reflect data
- Finish tabulating trace lengths to channel and complete C++ class to allow for fast query to time delays
- Do more testing on a larger sample of channels to confirm that prediction accurately reflect the true time delay



Experiences