Status Update of H2GCROC3 Cosmic Trigger Test Stand for DAQ at BNL and Cable length Study

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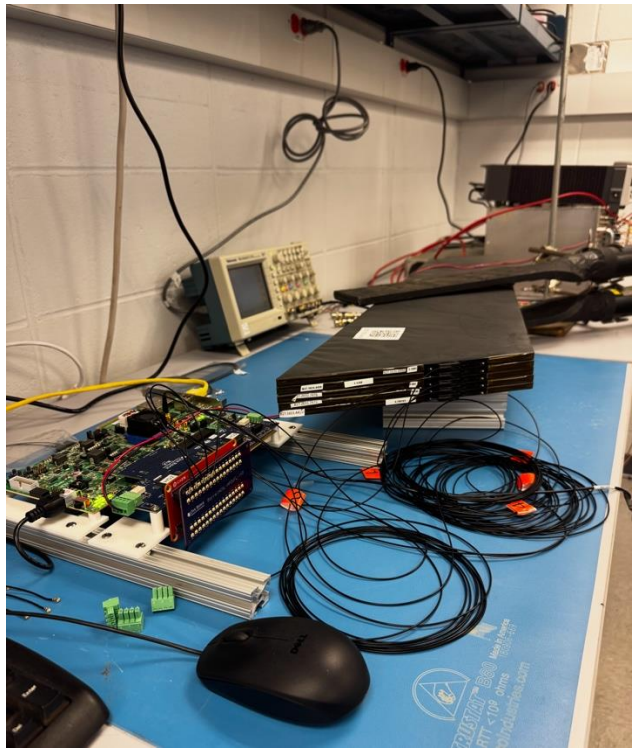
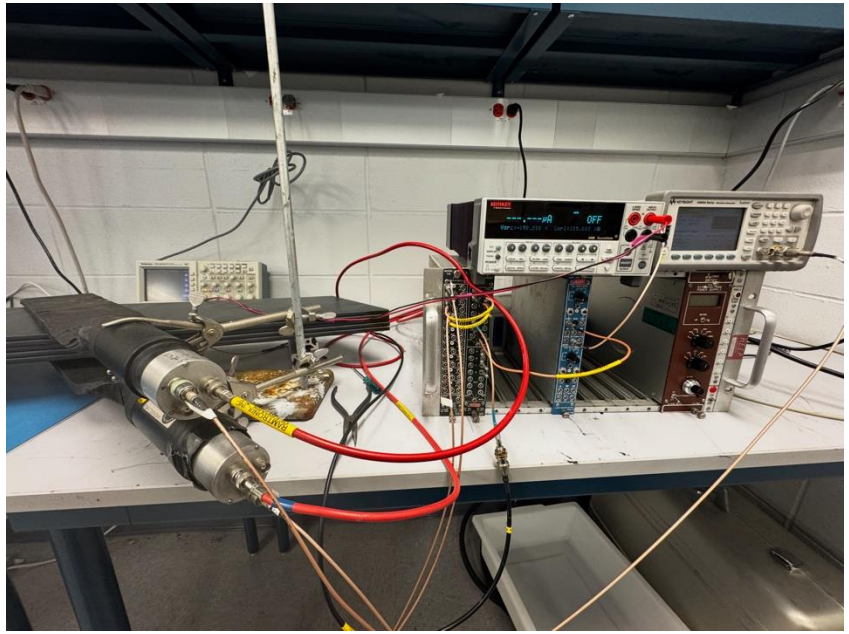
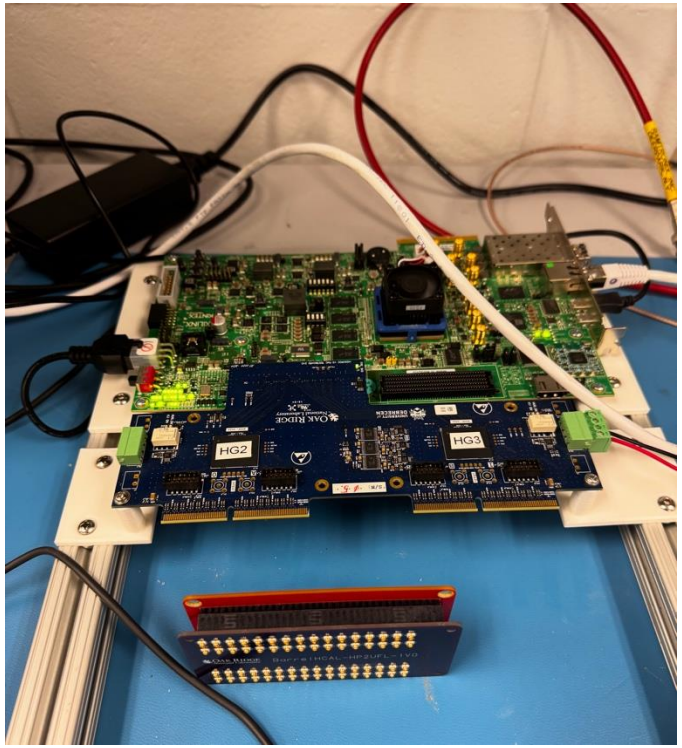
Status Update of Test Stand: Overview

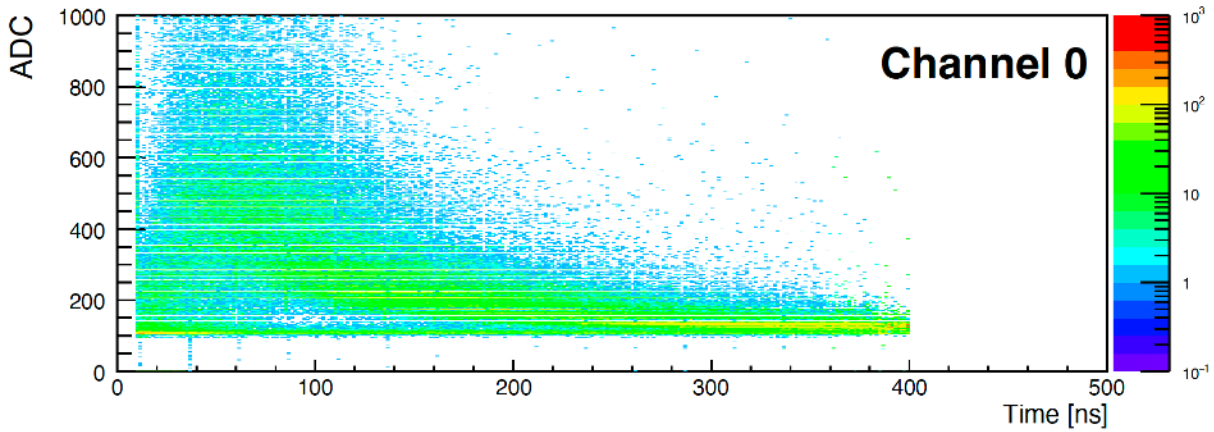
- Successfully taking data (one of the SiPMs is not working).
- Goal: Test how increasing the length of the cable affects the signal transmission??
- Signals from cables of length 50cm, 200cm, 300cm, 400cm, 500 cm are included.

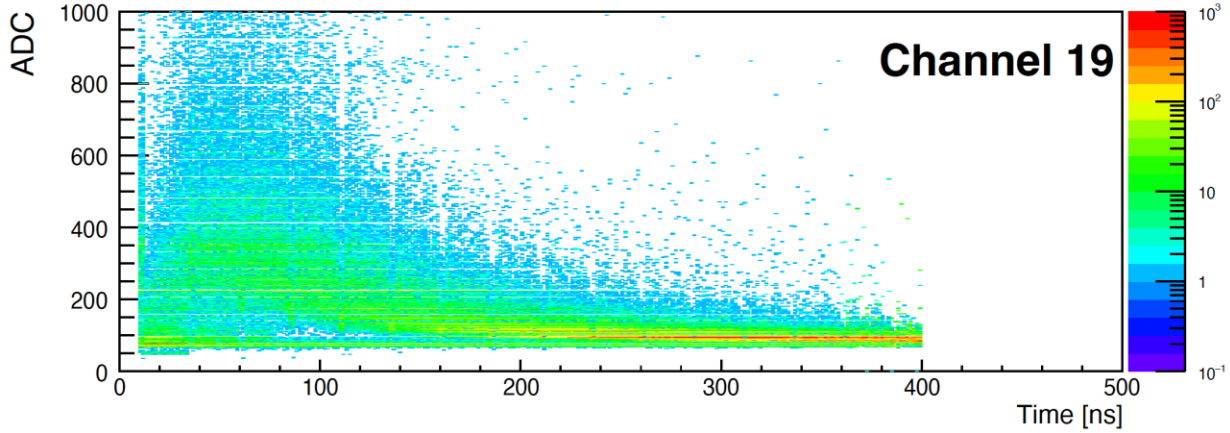


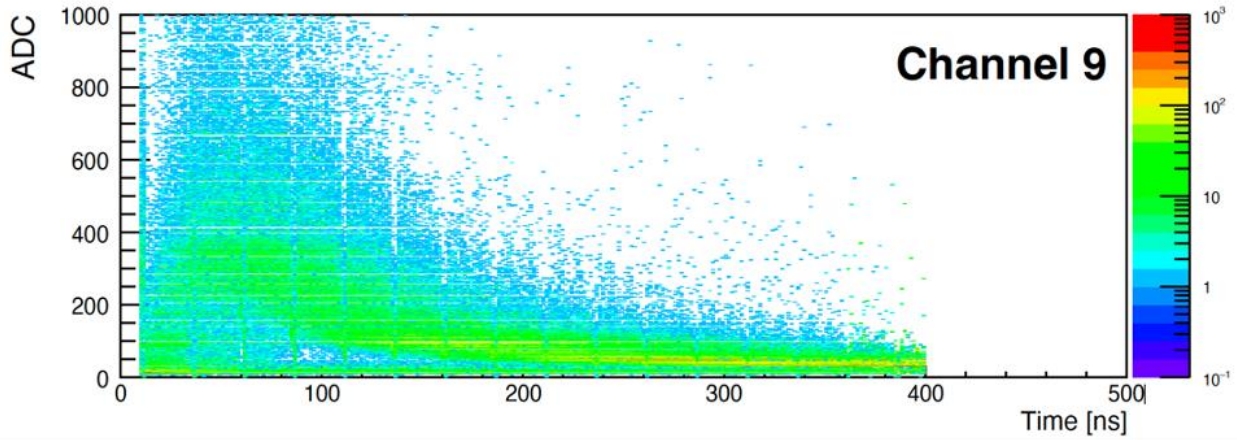


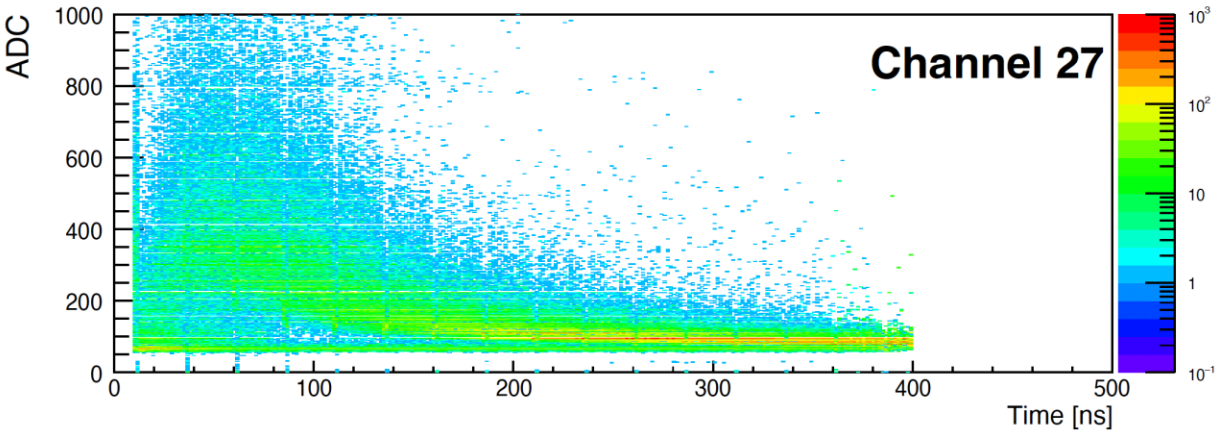


Signal with 50 cm Cable



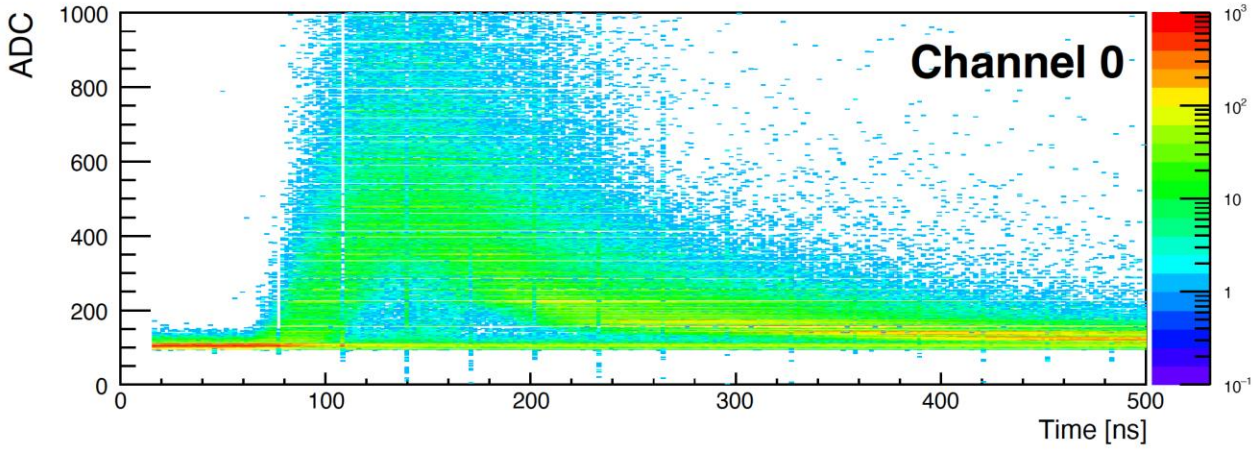


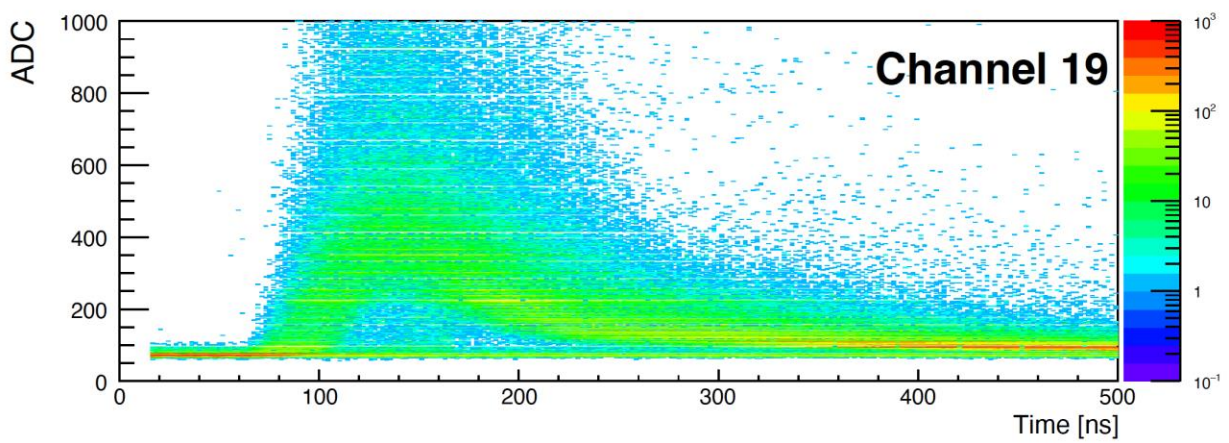


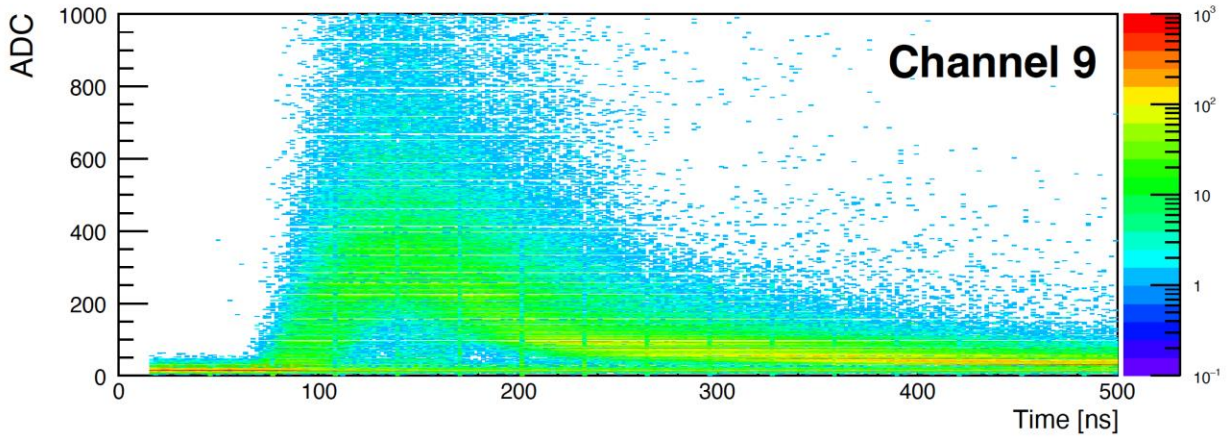


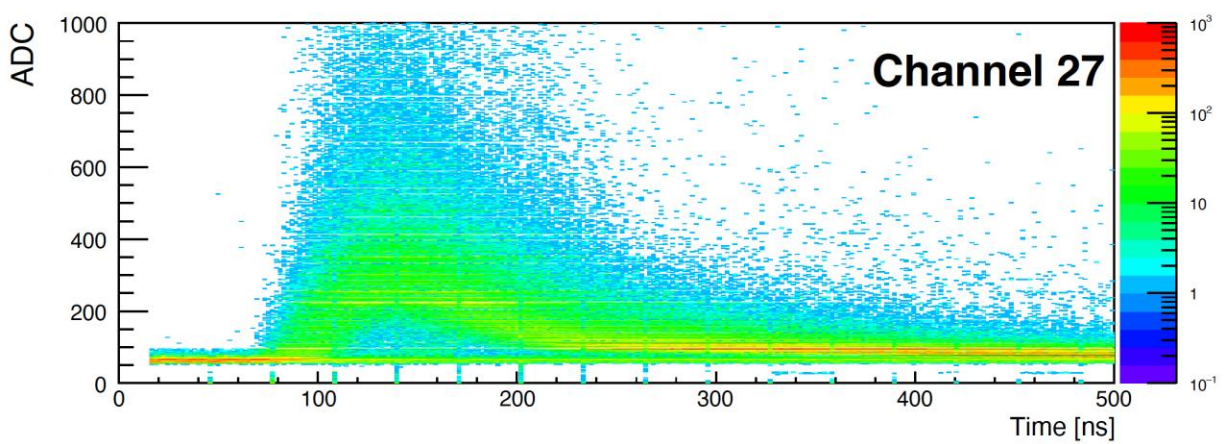
Thanks to Norbert for the plots!!

Signal with 200 cm Cable

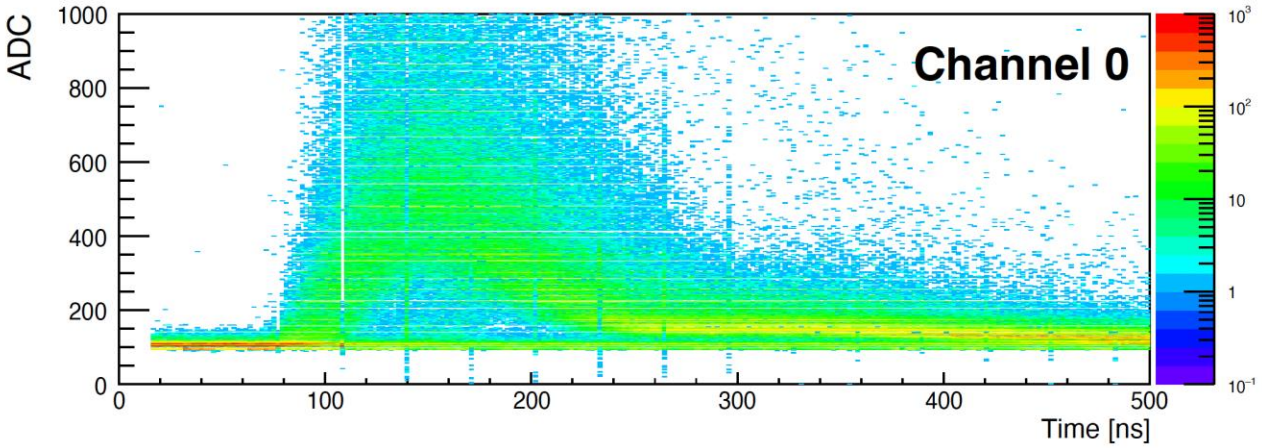


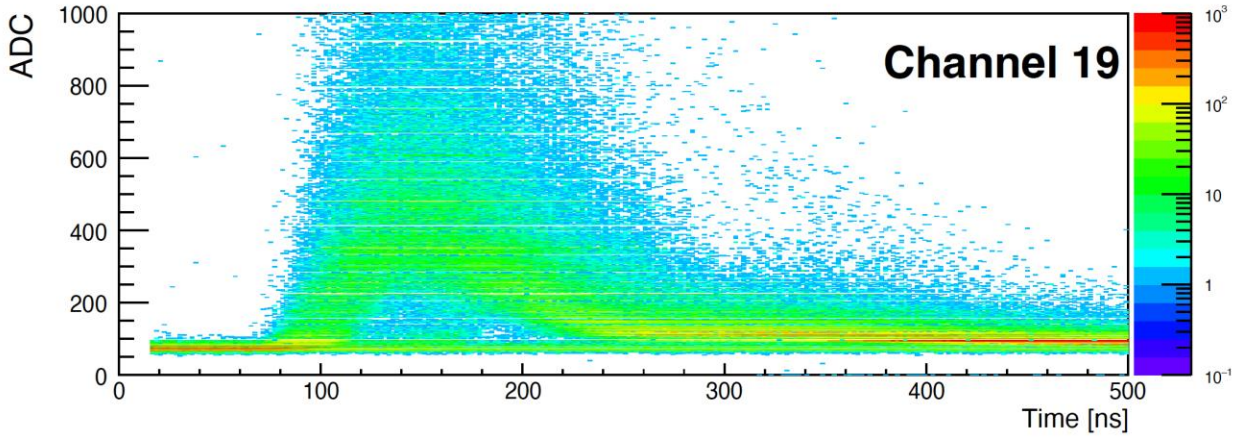


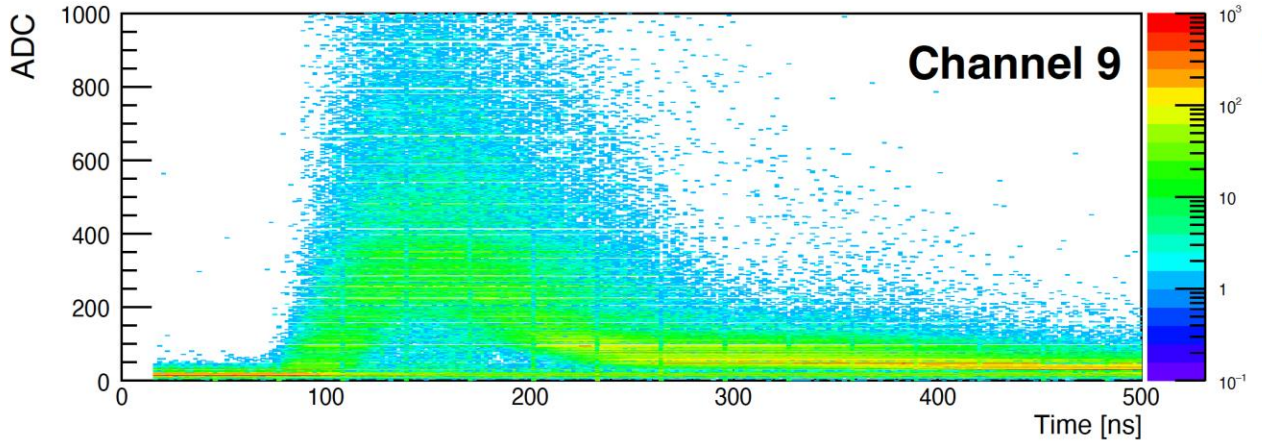


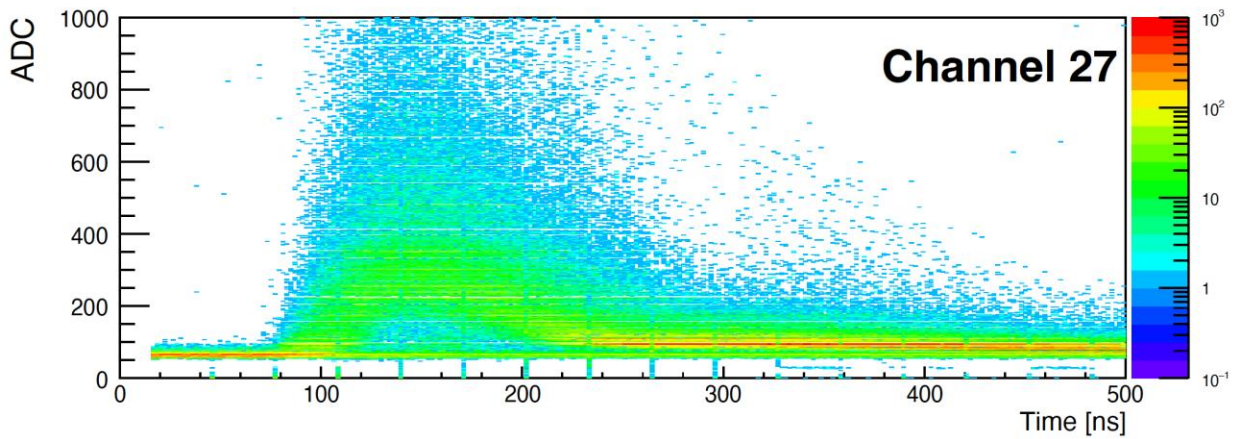


Signal with 300 cm Cable

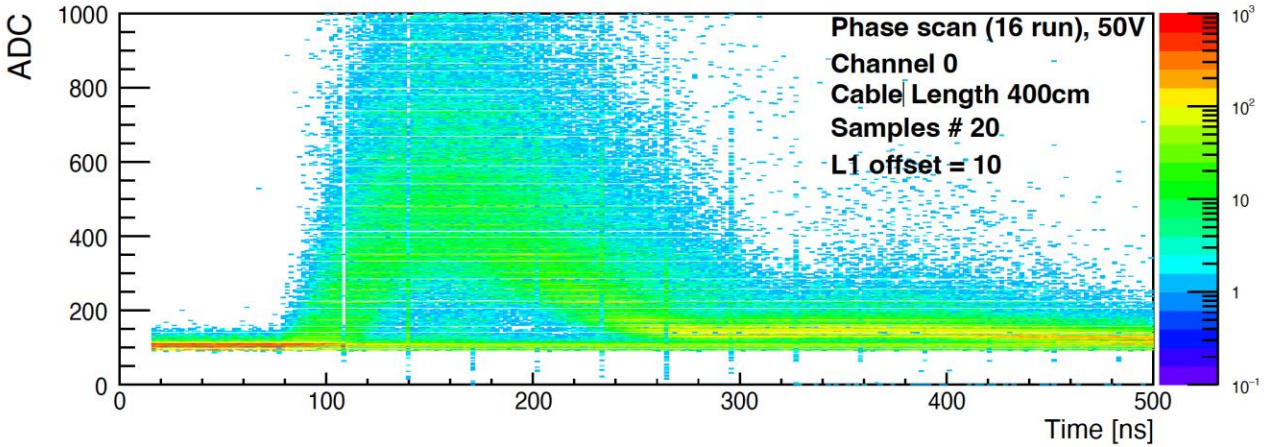


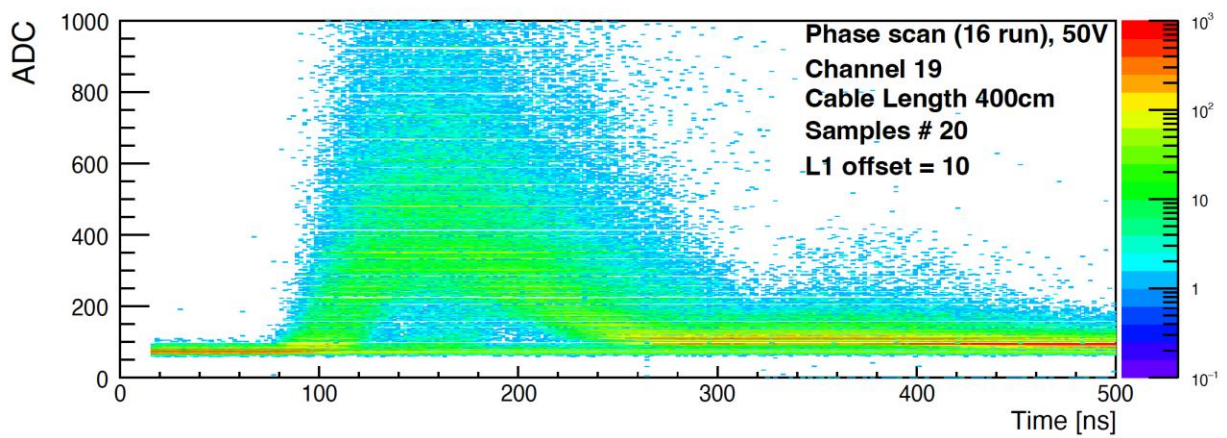


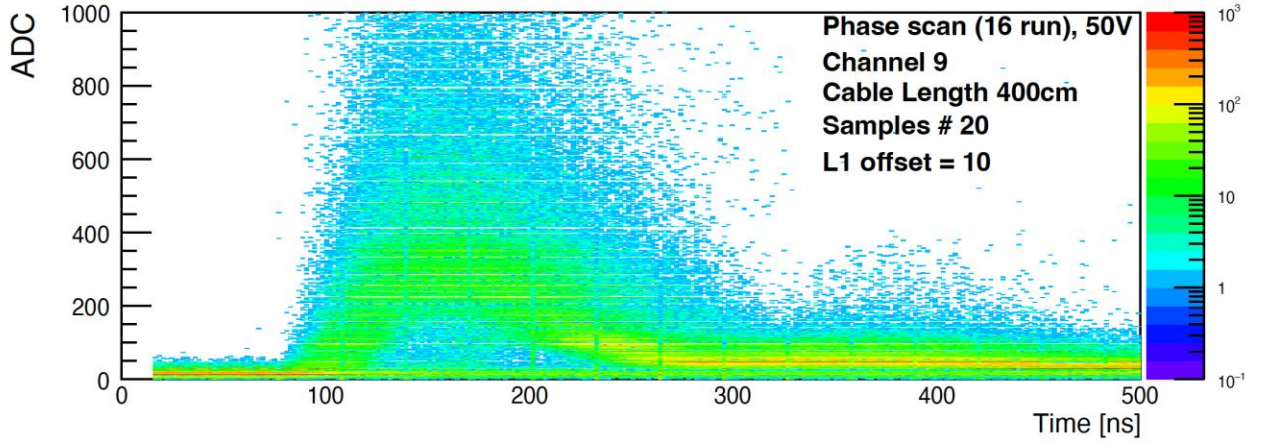


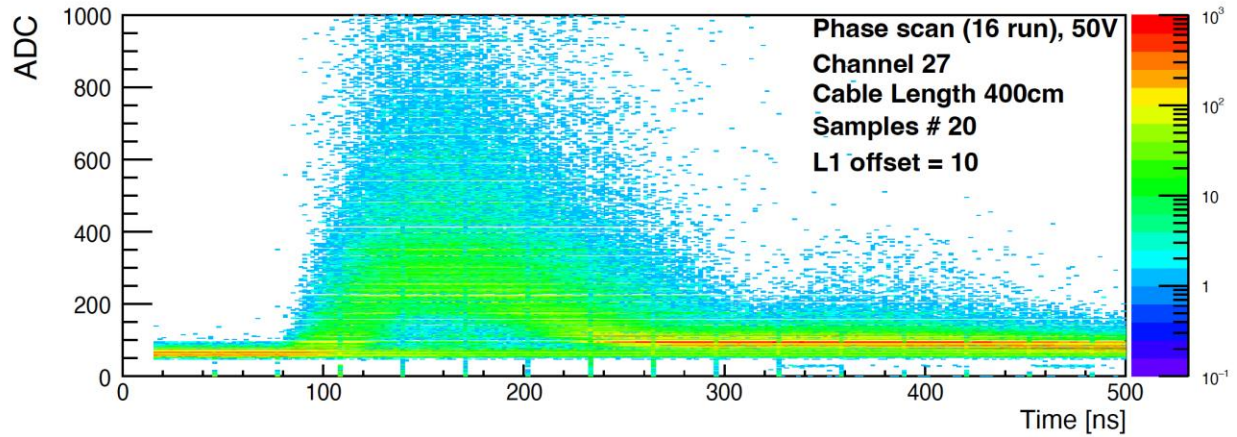


Signal with 400 cm Cable

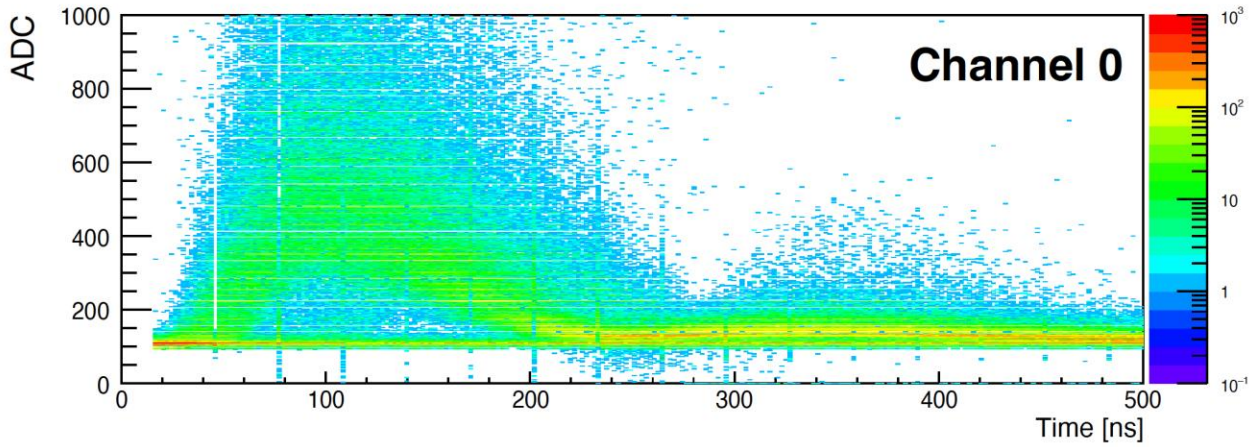


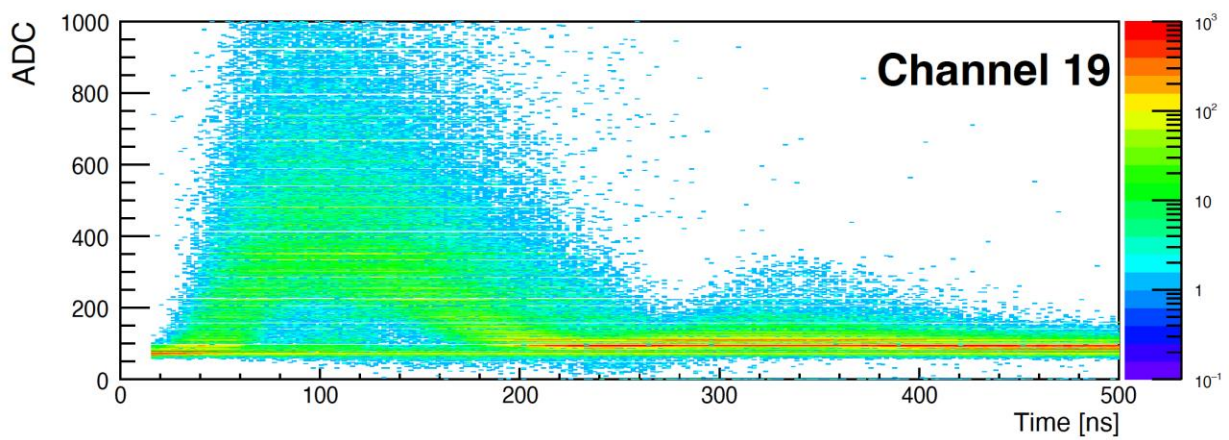


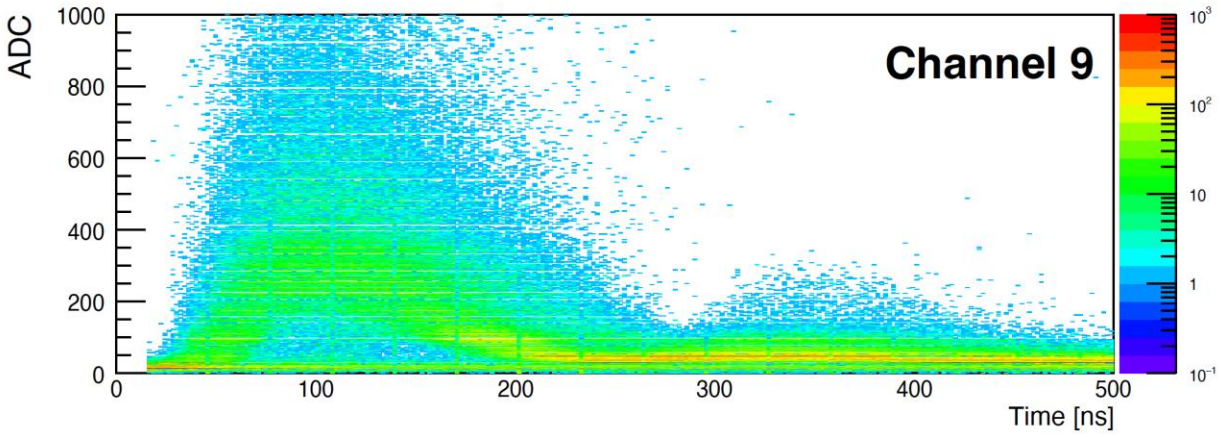


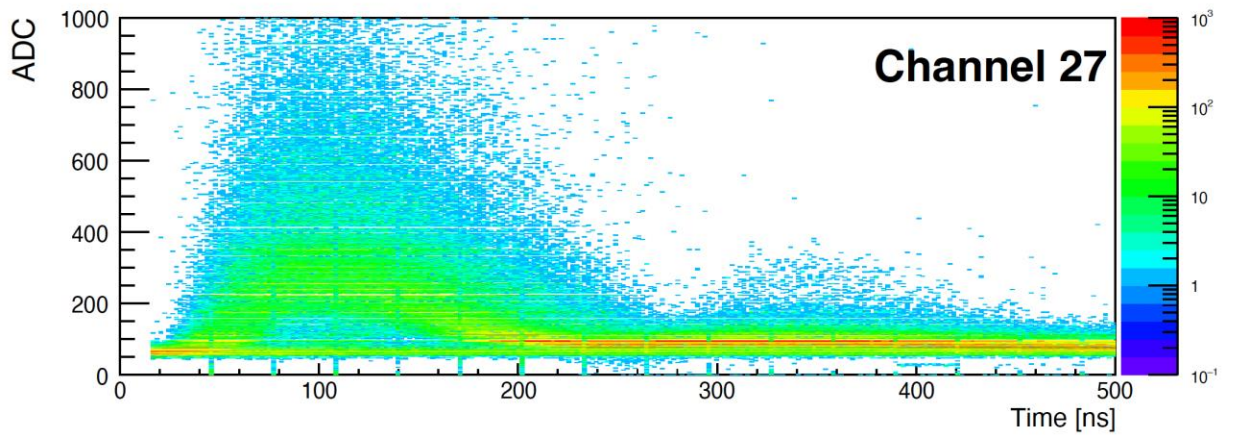


Signal with 500 cm Cable









Summary and Remarks

- ❑ When an electrical signal hits a boundary (end of a cable or an impedance mismatch), **part of the signal gets reflected** back toward the source and can interfere with the original signal.
- ❑ Ringing is caused by reflections → signal oscillates.

- As the cable length increases, signal integrity is affected as expected.
- Signal reflection starting to appear starting from cable of length 300cm.
- There is clear second peak in case of 400 cm and 500 cm cables.

a) Eric: Summer student can perform SPICE (Simulation Program with Integrated Circuit Emphasis) calculation and model signal propagation, reflections etc. with the H2GCROC3 input.
b) Time Domain Reflectometer – Norbert's suggestion.

Thank you!!