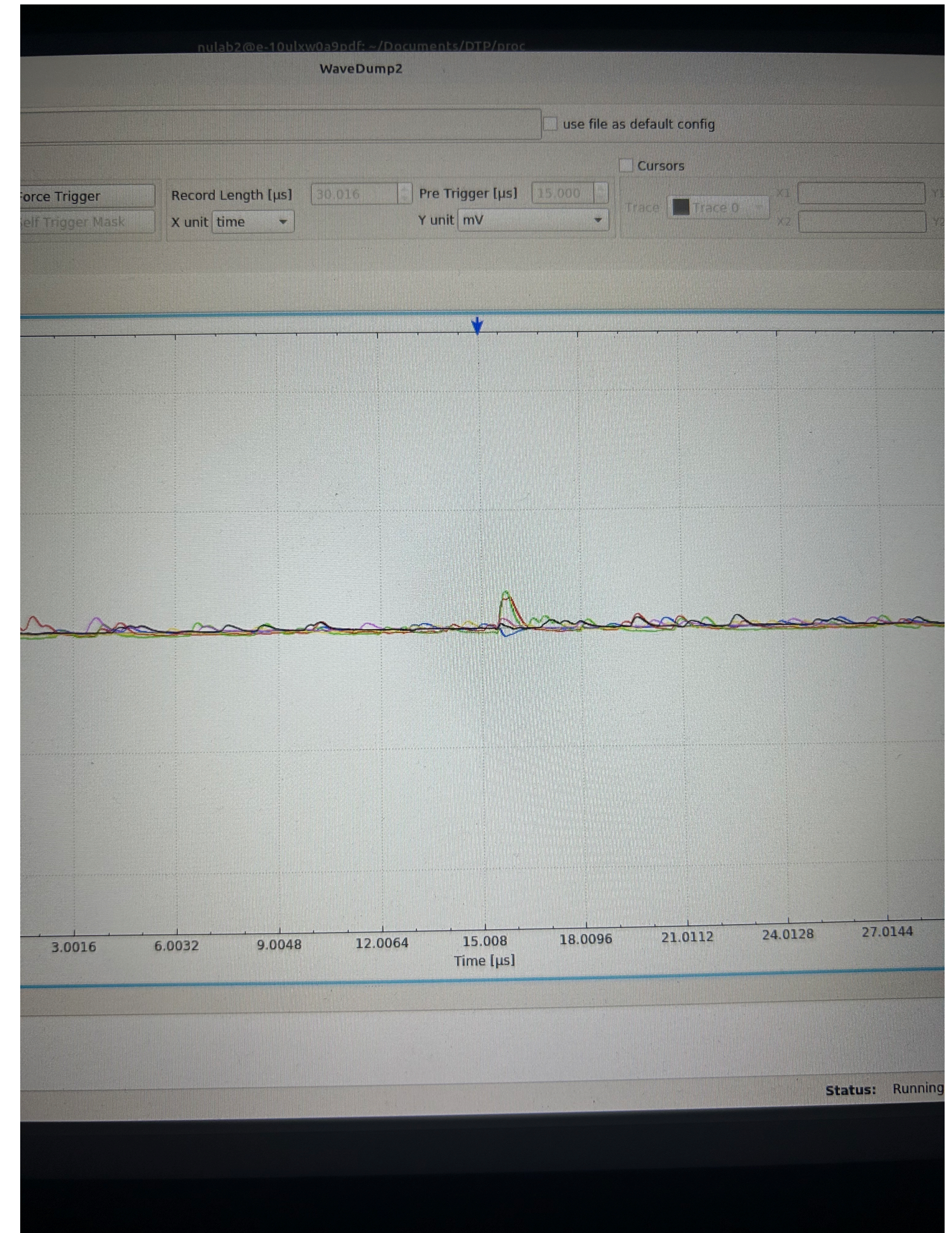
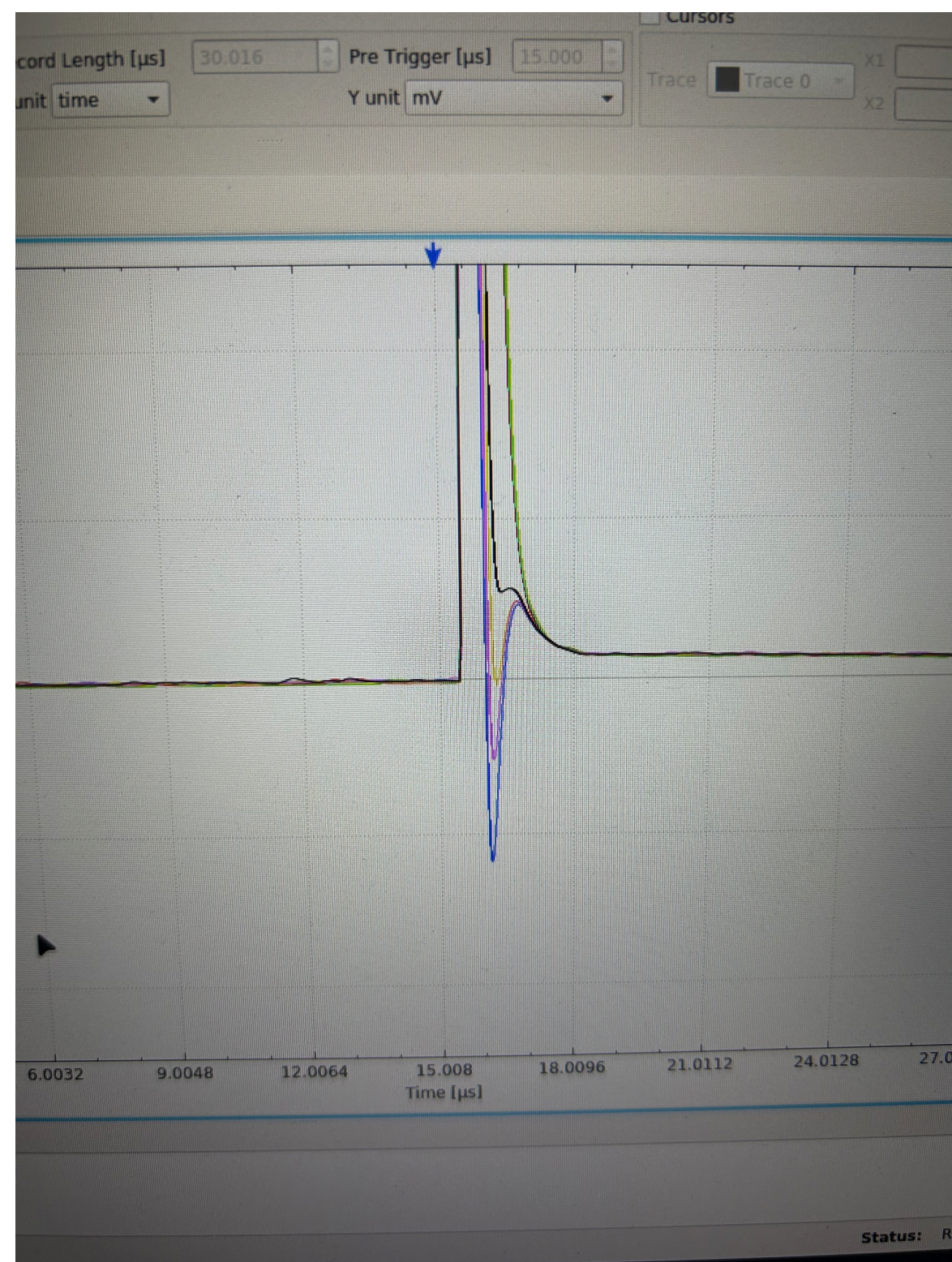


Prototype Troubleshooting

22/10/2025

Recap

- Negative undershoot in some, seemingly random, channels when trying to take data with LED

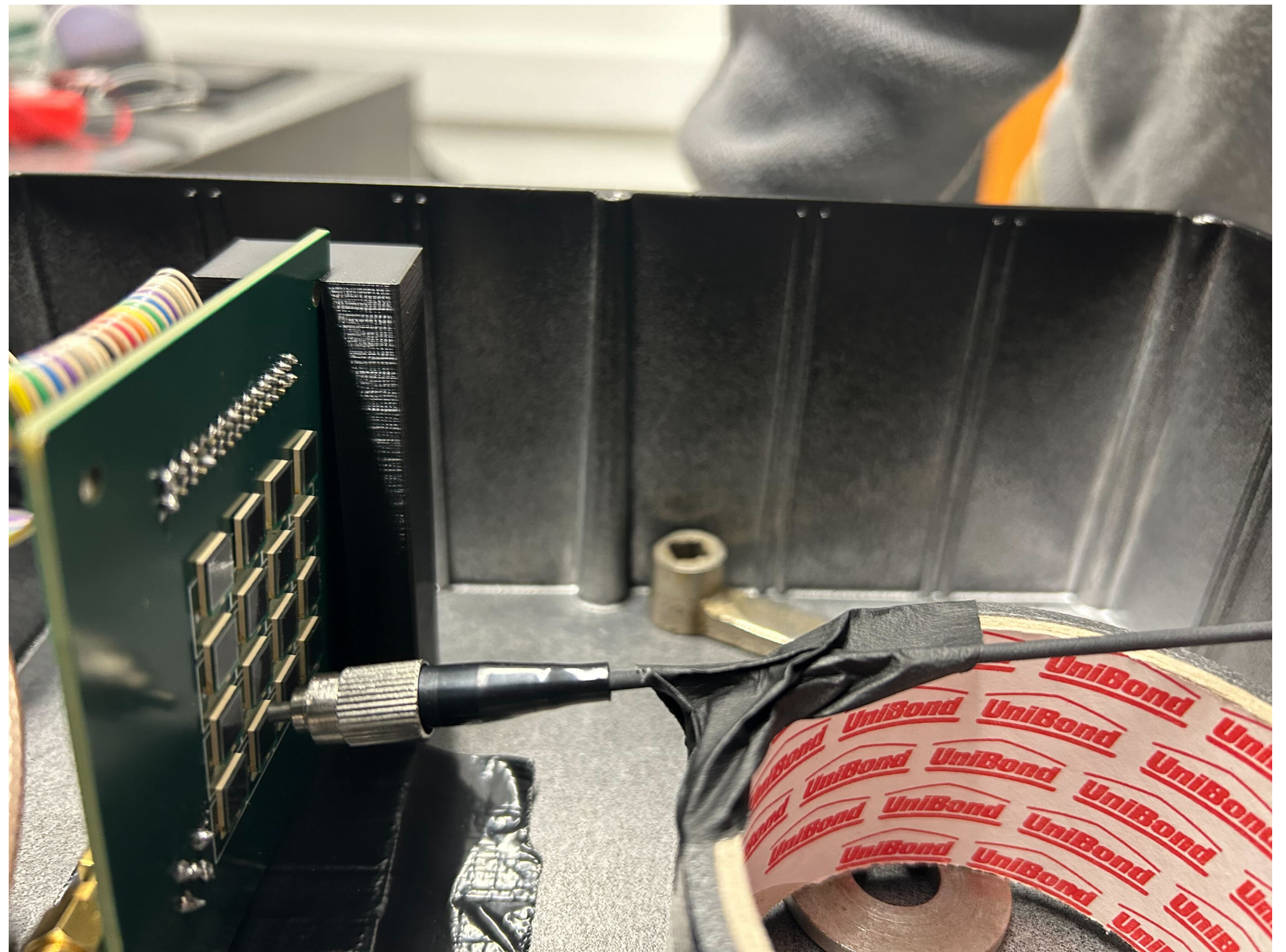


Troubleshooting

- Switched amplifiers, still see negative signal.
- Read the positive and negative outputs of the amplifier board. Positive and negative equal in size- **amplifiers not the problem**
- Switched the 75 micro board for the 50 micro board. All works fine for the 50 micro board- **the digitiser is not the problem**
- Applied a pulse from the SiPM pads on the board, all outputs were the same in wavedump
- Repeated the pulsing with the 50 micro board, same output as the 75 micro
- Cross talk is tiny (if any) between channels when applying a pulse- **The problem is not the board itself**
- Switched back to old enclosure and problem remains- **Dark box not the problem**
- Problem occurs with both the LED and the fiber- **The light source itself is not causing the problem**
- Checked (and resoldered) with Graham, same issue remains- **Does not seem to be an issue with connections between the board and the SiPMs (at least not for the problematic SiPM)**
- Measured bias at all SiPM cathodes- uniform at 10V
- Negative signal, even when triggered by pulse generator, does not seem to appear in the absence of light
- Increasing operating voltage also increases the amplitude of the negative signal (as well as the positive signals)
- Signal is very different when the anti static mat is removed- seems to have an undershoot but not a wholly negative signal
- Showed Graham the difference in signal between mat/no mat, only for the difference to have stopped. It seems that moving the set up is actually causing the differing signals
- Grounding the light source to the board may have helped the problem- some undershoots but never seems to be completely negative signal and the undershoots are rare anyway

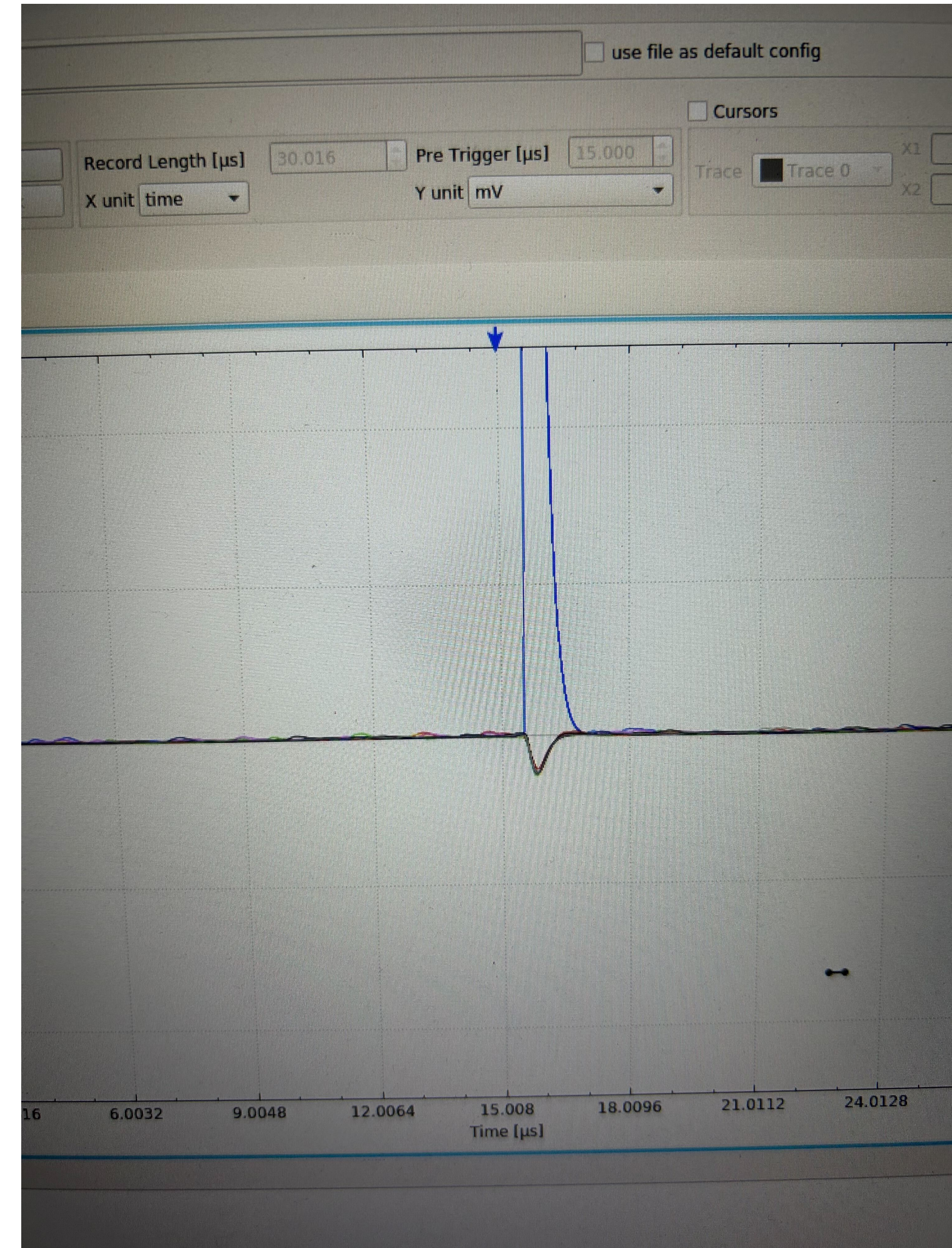
Crosstalk

- Direct the fiber optic at a single SiPM



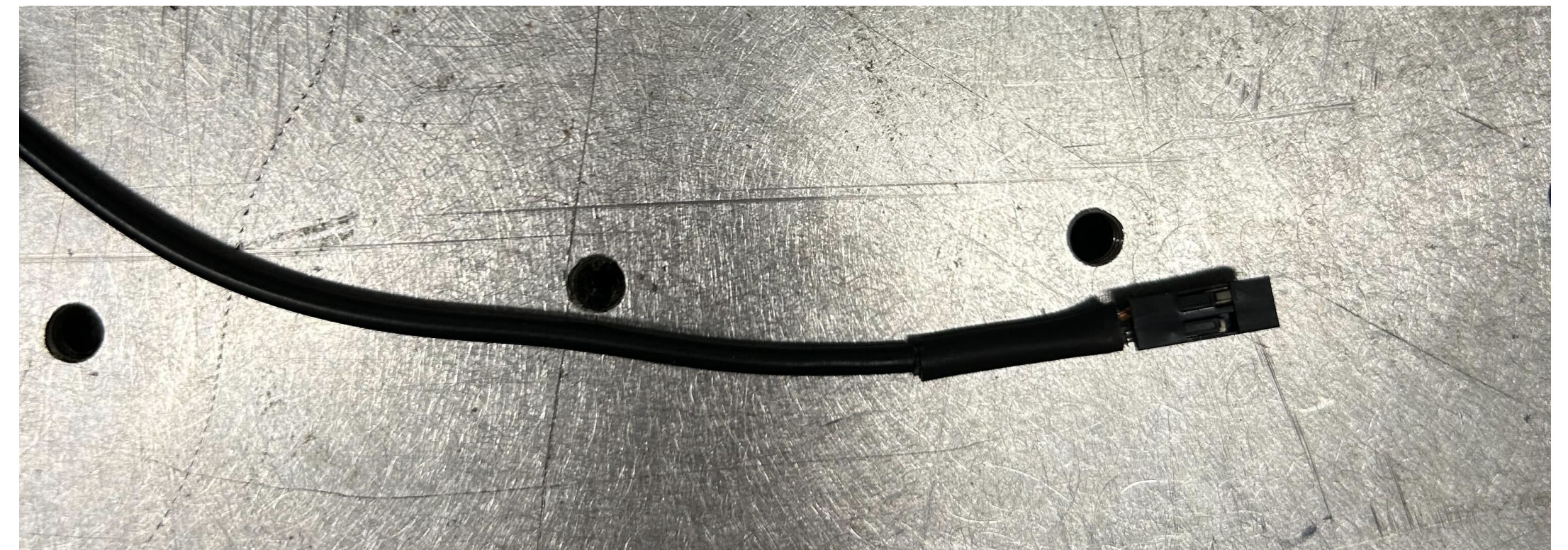
Crosstalk

- Direct the fiber optic at a single SiPM
- The SiPM in question shows an expected positive signal, whereas all other channels give a negative



Next Steps

- Need to determine where the crosstalk is happening
- Take the illuminated SiPM and one other
- Replace the ribbon cable with two coaxial cables, kept separate from each other
- The output signal should give us a strong indication whether the cross talk is in the board or the cables
- Report this to the engineers?
- Any other thoughts?



Final Note

- Last time I checked, the 50 micrometre prototype did not demonstrate this crosstalk effect
- Try to take data with this board in the meantime