UCF-CARSE data set - II: data taken at UCF lab with two antennas

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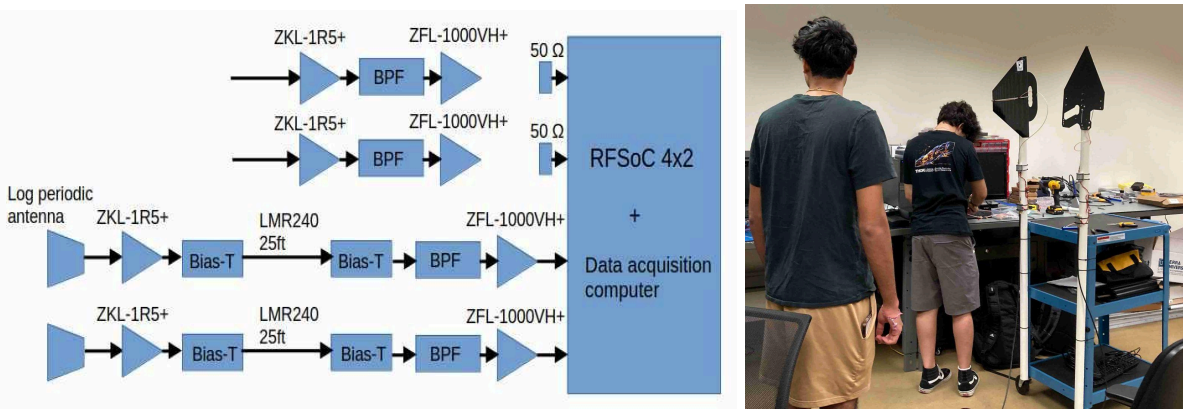

Figure 1 (left) illustrates the test setup at the UCF lab, featuring two antennas. It's important to note that these antennas function as electrically small elements at the designated operating frequency, as can be seen in the right image.

Fig. 1 illustrates the test setup at the UCF lab, which features two antennas intended to capture radio frequency interference from the surrounding environment. These antennas function as electrically small elements operating near 35 MHz. For our data collection, we utilized the 49.152 MHz sampling frequency mode of the 4-channel system [see 1]. The data was recorded for five minutes. Below is the filename containing the ADC voltage samples collected during this period.

-rw-rw-r-- 1 anish anish 109G Oct 4 12:50 20241004_164528_0000.dat

The data were processed using the executable of corr_cpu_complex_v2.c, referred to as "corr". The processing involved the following command. We utilized a default FFT length of 1024 and averaged 4096 FFTs, which corresponds to approximately 341 milliseconds of cross-product averaging.

./corr -a 4096 -i /mnt/carsedat/20241004_164528_0000.dat -o procdat/20241004_164528_0000

Below is a list of processed files. The *.LCCSPC file contains the cross spectra, and the *.LACSPC files have the self spectra.

-rw-rw-r-- 1 anish anish 162M Oct 4 15:31 20241004_164528_0000.LCCSPC
-rw-rw-r-- 1 anish anish 54M Oct 4 15:31 20241004_164528_0000.LACSPC

Figs 2, 3, and 4 show example plots from the data visualization programs examineCC.py and graysCCandAuto.py.

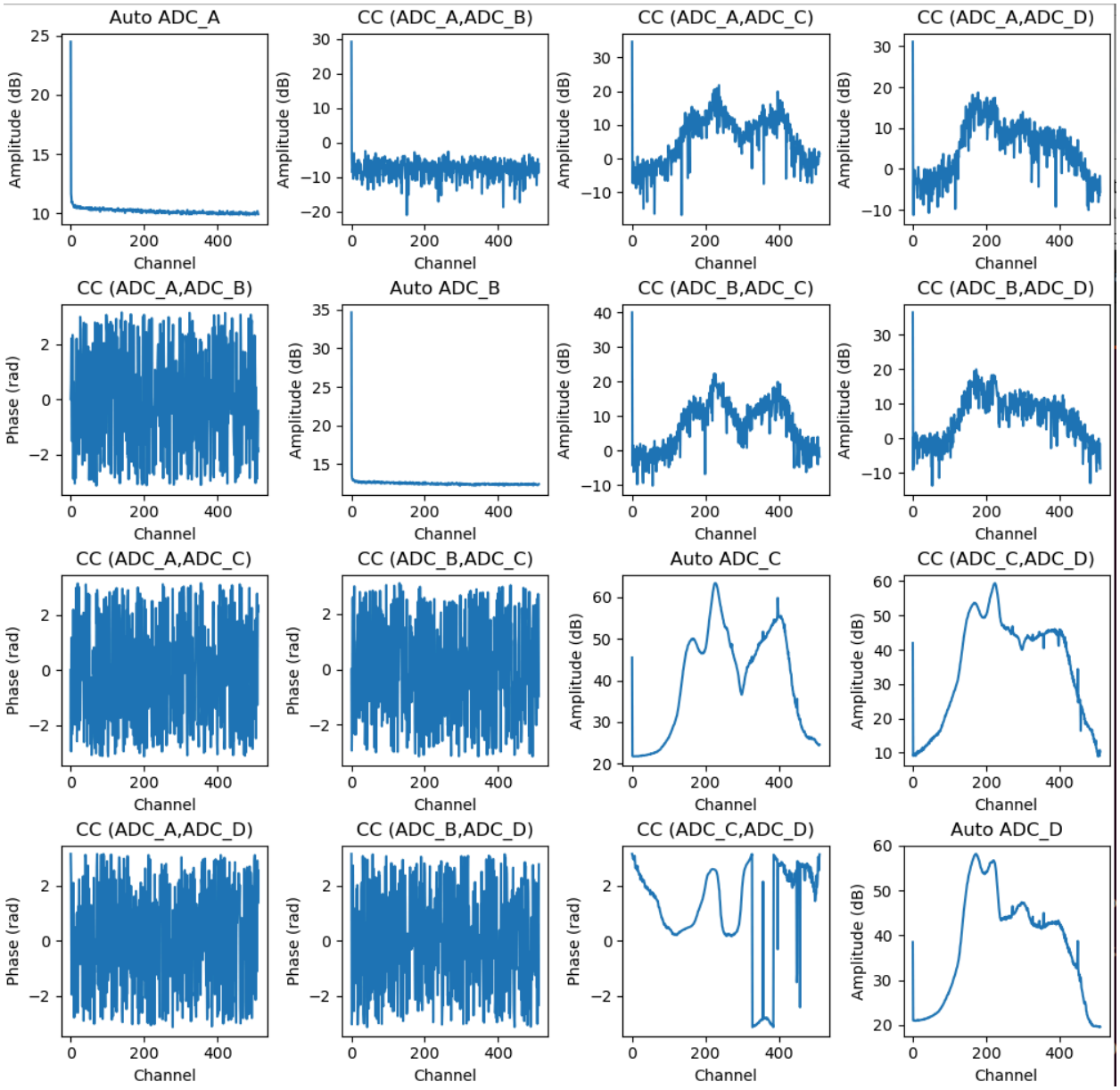

Figure 2 shows the self spectra (diagonal plots) and amplitudes of cross spectra ('upper triangle' plots). The 'lower triangle' plots are the corresponding phases of the cross spectra.

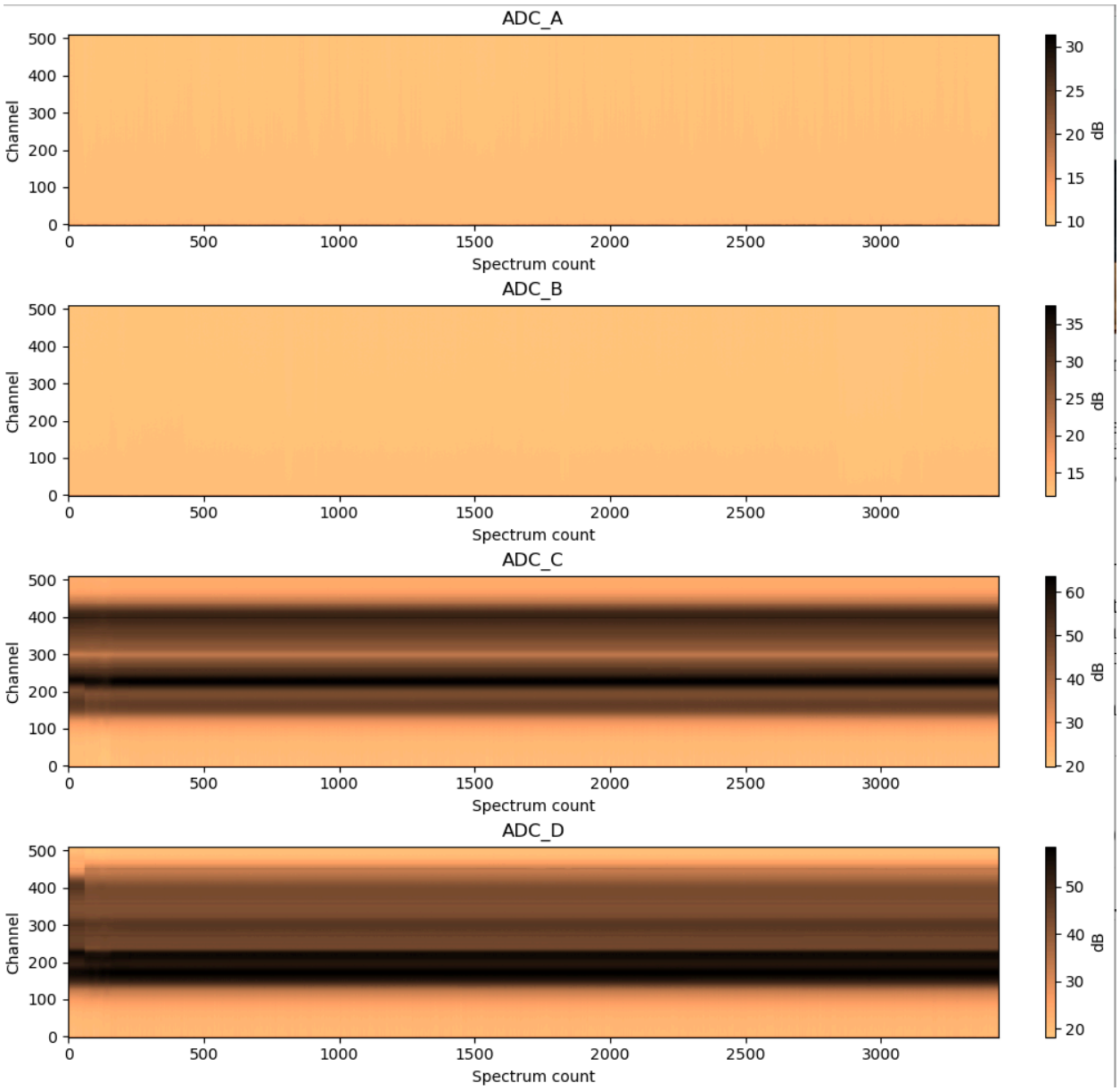

Figure 3 shows the self spectra from the four ADCs vs time obtained for the one-hour data.

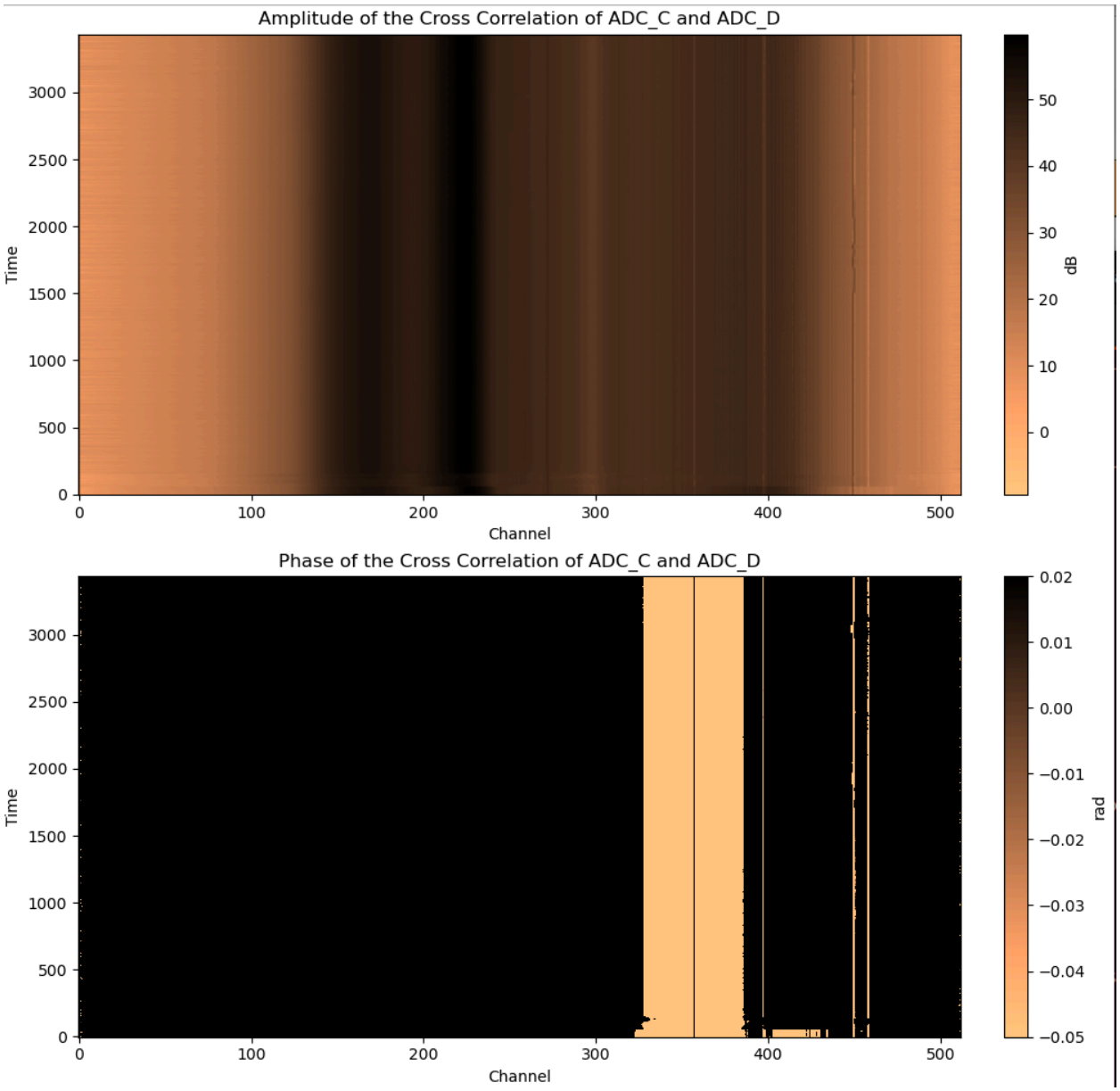

Figure 4 shows the amplitude (top) and phase (bottom) of the ADC_C-ADC_D cross spectra obtained for the one-hour data.

References

[1] D. Anish Roshi, E. Armas, C. Wescott, W. Dellinger, N. Patel, "A four-channel voltage recording system for Radio Frequency Interference mitigation research", CARSE report, October 2024, https://carseuprm.org/resources/publication-rscs/