

The column header is $\Delta\alpha$ and the row header is distance.

Since the result is not the same every time, I will do 10 runs for each setting. Then, I will calculate the result for each run, filter out one maximum and one minimum and calculate the mean. The filled values in the two tables below are the mean value of the (10-2=8) runs.

Data rate table

	20cm	40cm	80cm	120cm
0.1	2.58	1.94	1.44	1.18
0.5	2.85	2.24	1.71	1.37

Bit error rates table

	20cm	40cm	80cm	120cm
0.1	0.32	0.49	0.62	0.69
0.5	0.25	0.41	0.55	0.64

Explain the results:

With the same $\Delta\alpha$, as the distance between the transmitter and receiver increases, the bit error rate increases and the data rate decreases. With the same distance, the bit error rate of $\Delta\alpha = 0.1$ is higher than that of $\Delta\alpha = 0.5$, and the data rate of $\Delta\alpha = 0.1$ is lower than that of $\Delta\alpha = 0.5$.

For the distance, I think that's because when the receiver moves farther away from the transmitter, it can't notice the α (intensity) change of the transmitter picture well due to the surrounding environment. I didn't do all the noise (like ambient light) decorrelation mentioned in the paper so the distance plays a pretty important role in the performance. When the distance is small, most of the captured image of the receiver is the picture of the transmitter, and any intensity change of the image is most likely due to the α change of the transmitter picture. However, when the distance is large, most of the captured image of the receiver is the surrounding environment, and any intensity change of the image is less likely due to the α change of the transmitter picture. The light change of the surrounding environment has larger impact on the intensity of the captured image when the distance is larger.

For the $\Delta\alpha$, I think that's because when the α difference is larger, the α change of the transmitter picture can be more easily noticed by the receiver. Thus, the receiver can distinguish between different α 's among consecutive captured images, and then determine the frequency more easily and accurately. When the α change is larger, it can dominant the impact of the surrounding environment, but when the α change is smaller, it has less impact on the intensity change of the captured images than the impact of the surrounding environment.