

Sensing Function at Higher Frequencies

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Sensing Function (T1500377)

$$C_0 = \frac{C_{res}}{(1 + i f / f_c(t_0))}$$

$$C(t) = \frac{DARM_{err}}{TxPD}$$

$$C(t) = \kappa_C(t) \frac{C_{res}}{(1 + i f / f_c(t))}$$

$$C_0 = \frac{C(t)}{\kappa_C(t)} \frac{(1 + i f / f_c(t))}{(1 + i f / f_c(t_0))}$$

Calibration Lines

Freq	FFT	Real ¹	Imag ¹	Coherence ²
• 1001.3	10	0.023258	-0.366287	0.999589
• 1501.3	10	-0.018177	-0.110755	0.999943
• 2001.3	10	-0.015843	-0.044920	0.999391
• 2501.3	30	-0.011678	-0.021109	0.998321
• 3001.3	30	-0.008029	-0.010992	0.999057
• 3501.3	30	-0.005673	-0.006241	0.990997
• 4001.3	60	-0.004349	-0.003285	0.996833
• 4301.3	60	-0.003729	-0.002291	0.985922
• 4501.3	60	-0.003356	-0.002157	0.990728
• 4801.3	60	-0.002907	-0.001381	0.959987
• 5001.3	60	-0.002906	-0.001055	0.965237

1. Time Dependent Parameters applied.

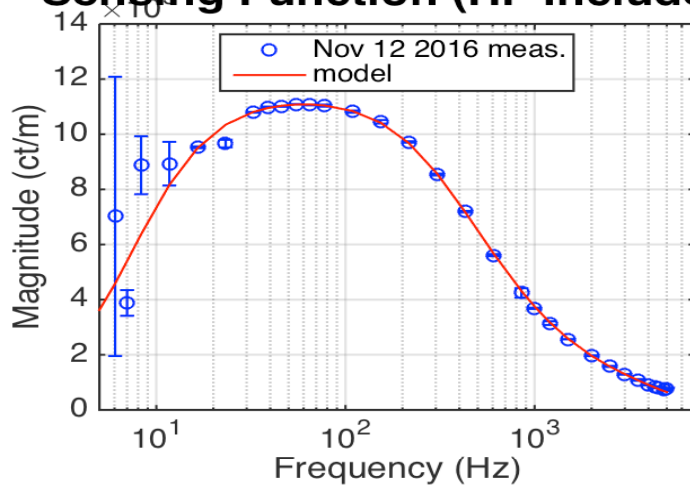
2.
$$Coh = \frac{|f(x) \cdot f(y)^*|^2}{|f(x) \cdot f(x)^*| \cdot |f(y) \cdot f(y)^*|}$$

Time Dependent Parameters

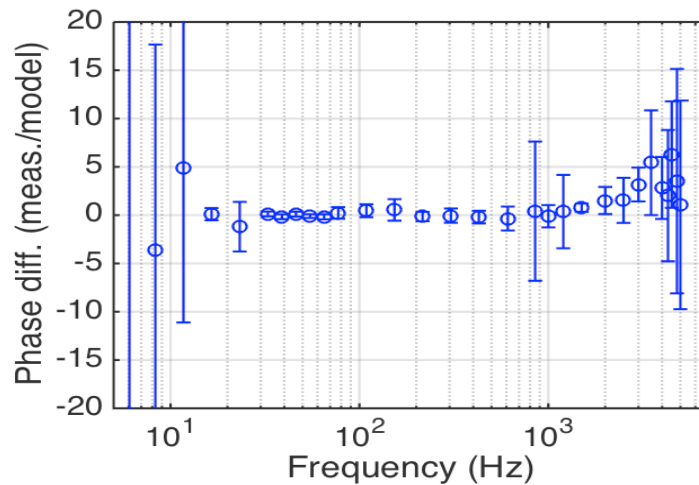
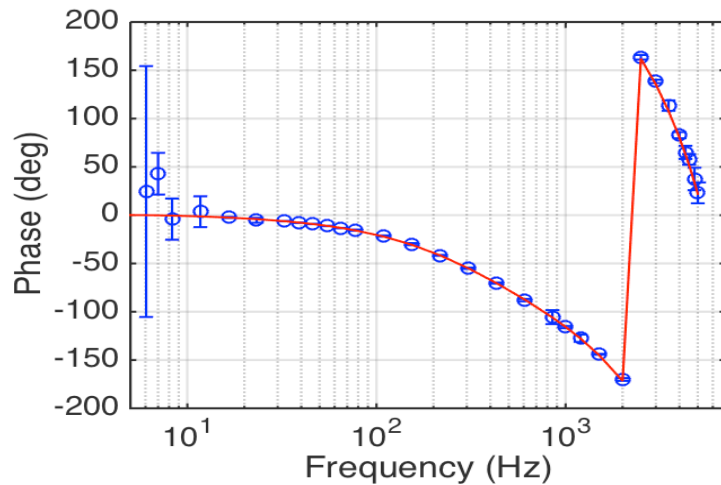
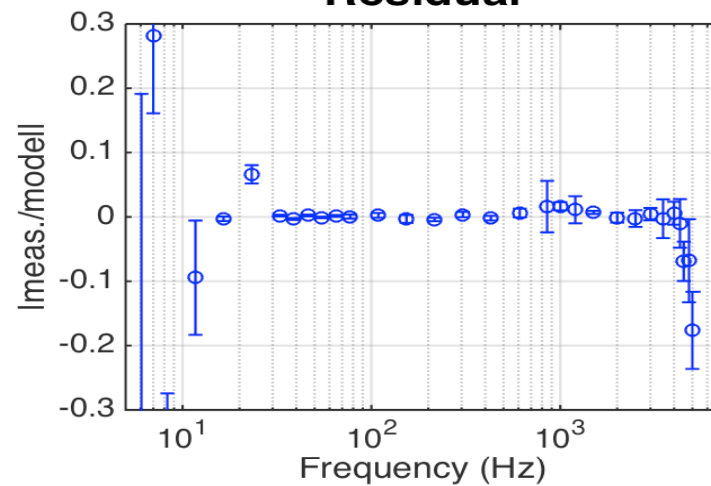
Freq	Opt. Gain (kappaC)	Cavity Pole(fc)
• 1001.3	0.98449	345.0278
• 1501.3	0.98869	348.0117
• 2001.3	0.98846	347.8276
• 2501.3	0.97337	347.7468
• 3001.3	0.96303	346.3192
• 3501.3	0.97841	350.4883
• 4001.3	1.001	346.8396
• 4301.3	0.97873	342.7761
• 4501.3	1.0061	345.8409
• 4801.3	0.99362	346.3117
• 5001.3	0.96364	347.8947

H1: Sensing Function

Sensing Function (HF Included)



Residual



Relevant Files

- Data Files:

- Runs/ER10/H1/Measurements/DARMOLGTFs/HF_2016-11-12_H1_DARM_OLGTF_A_DARMIN2_B_DARMIN1_coh.txt
- Runs/ER10/H1/Measurements/DARMOLGTFs/HF_2016-11-12_H1_DARM_OLGTF_A_DARMIN2_B_DARMIN1_tf.txt
- Runs/ER10/H1/Measurements/PCAL/HF_2016-11-12_H1_PCAL2DARMTF_A_PCALYRX_B_DARMIN1_tf.txt
- Runs/ER10/H1/Measurements/PCAL/HF_2016-11-12_H1_PCAL2DARMTF_A_PCALYRX_B_DARMIN1_coh.txt

- Parameter Files:

- Runs/ER10/H1/params/HF_2016-11-12/

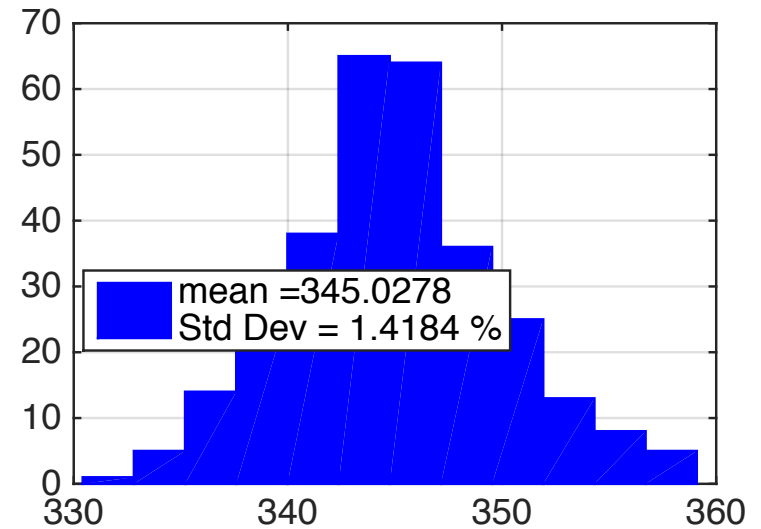
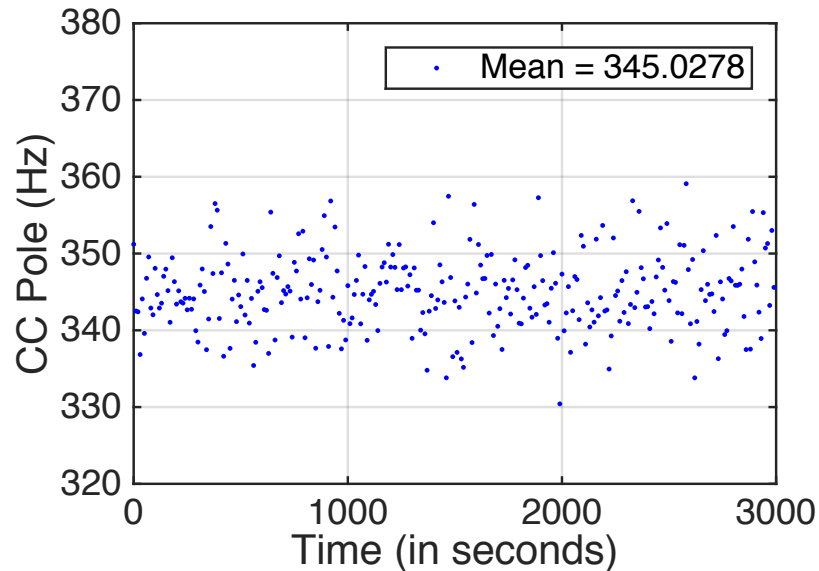
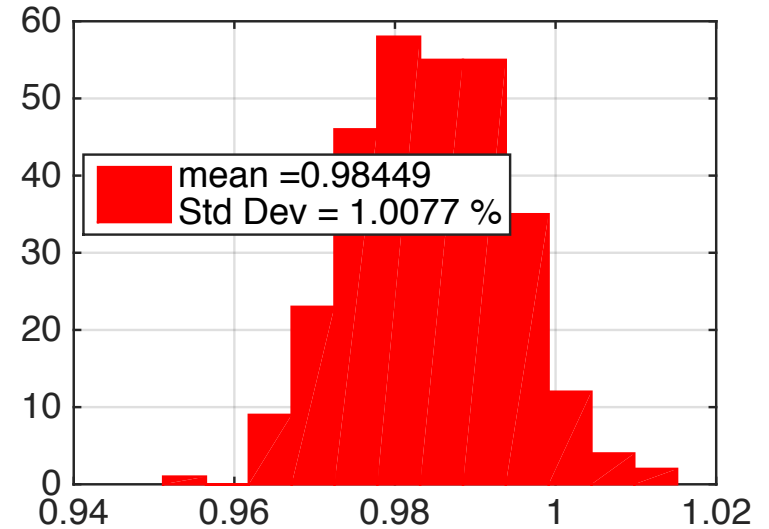
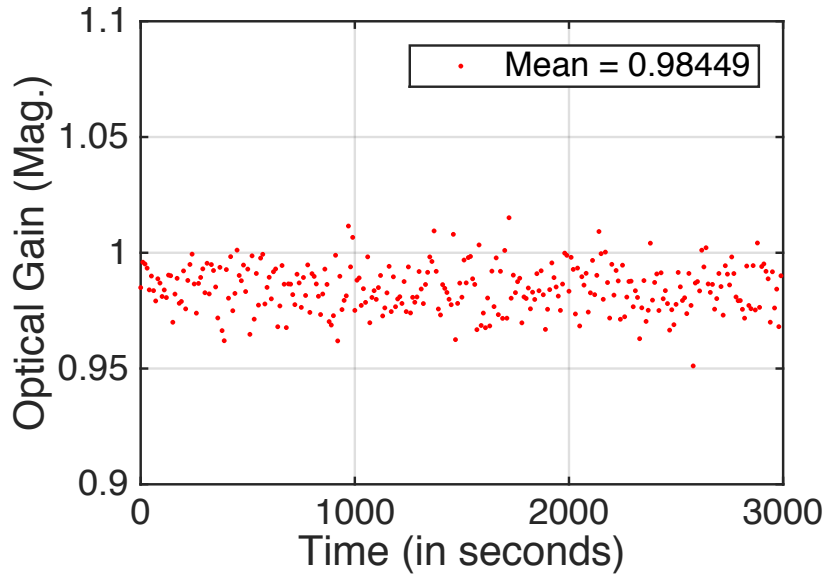
- Script:

- Runs/ER10/H1/Scripts/SensingFunction/compareSensingHF.m

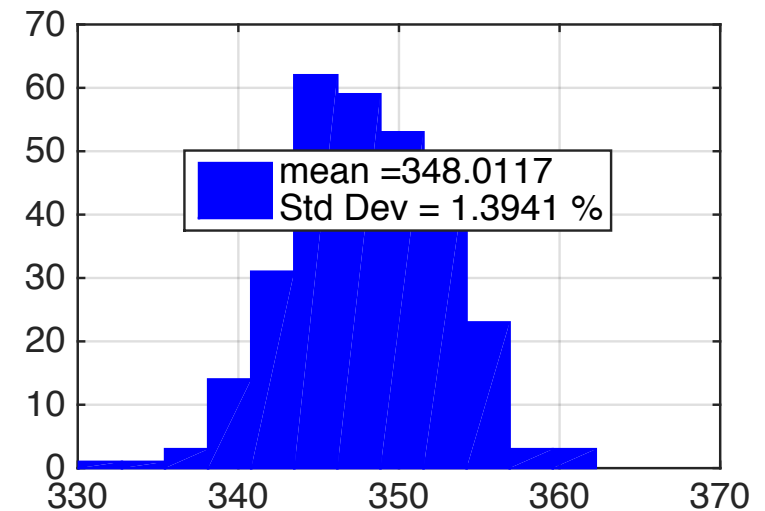
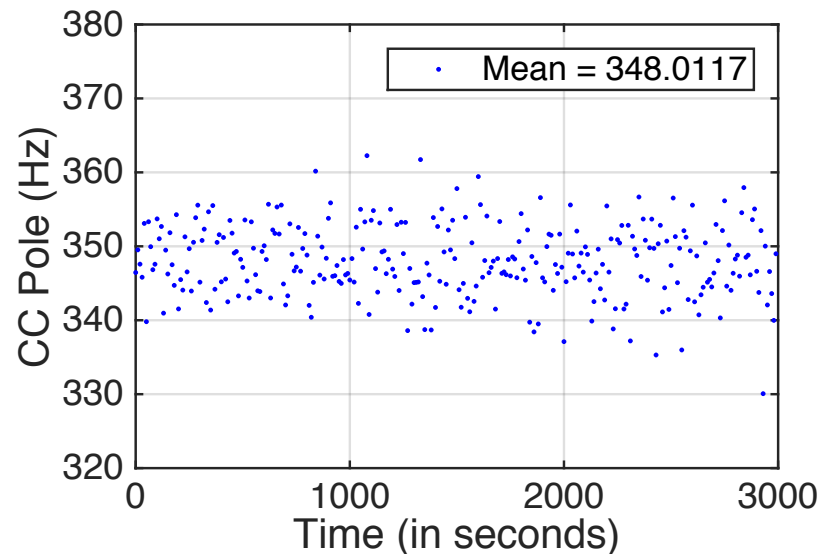
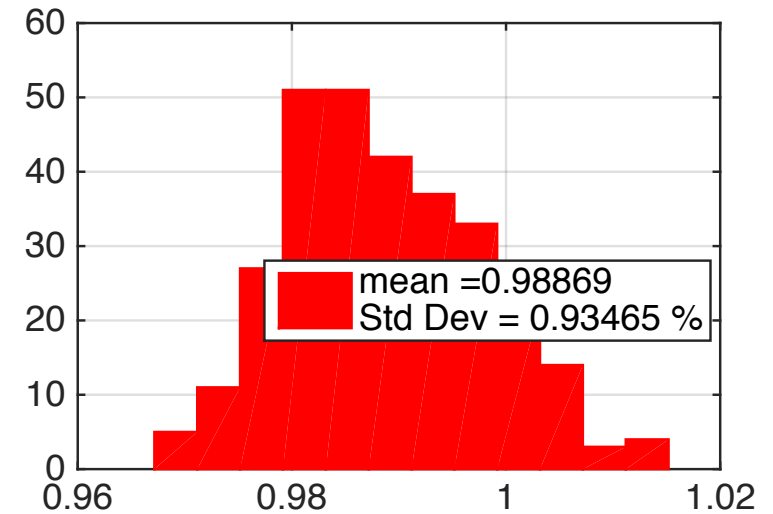
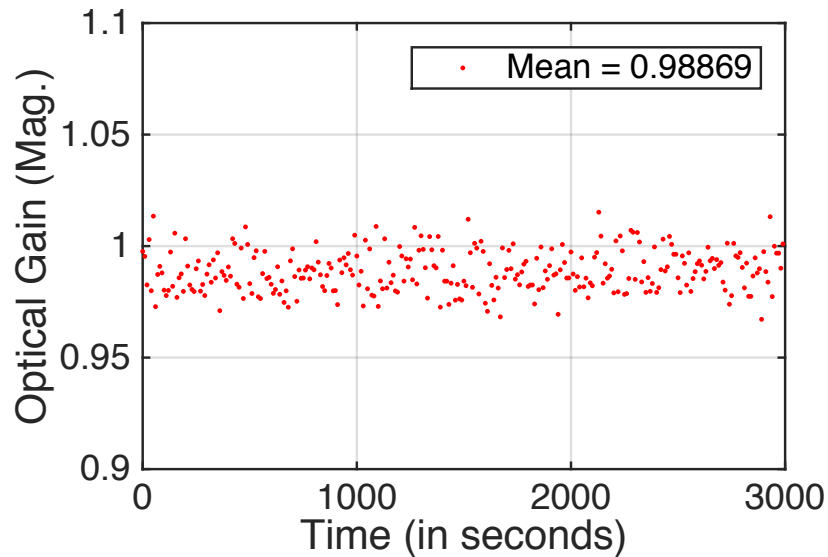
Appendix

Estimating Time Dependent Parameters

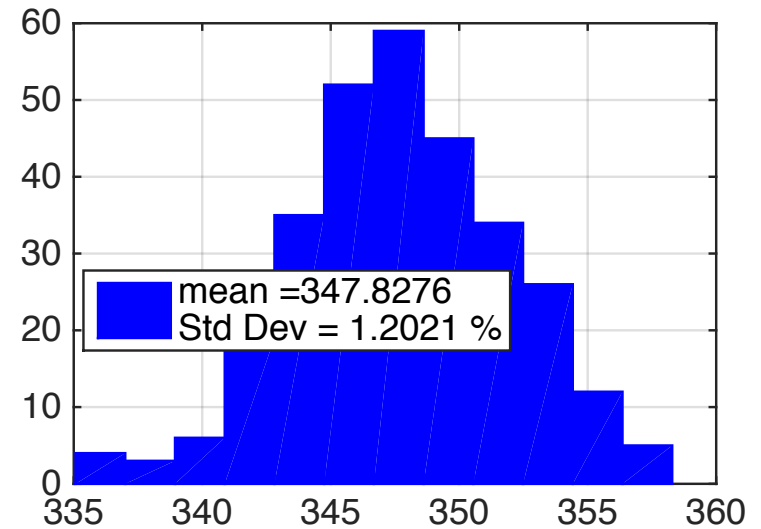
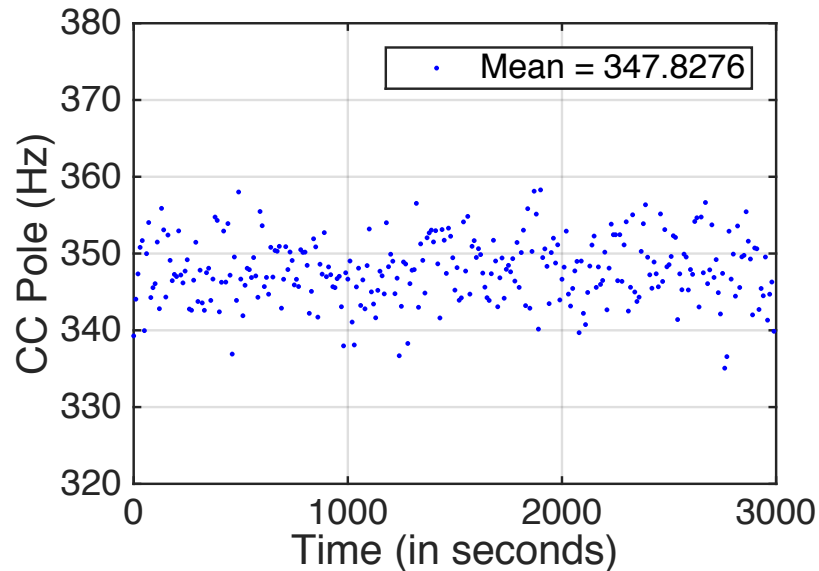
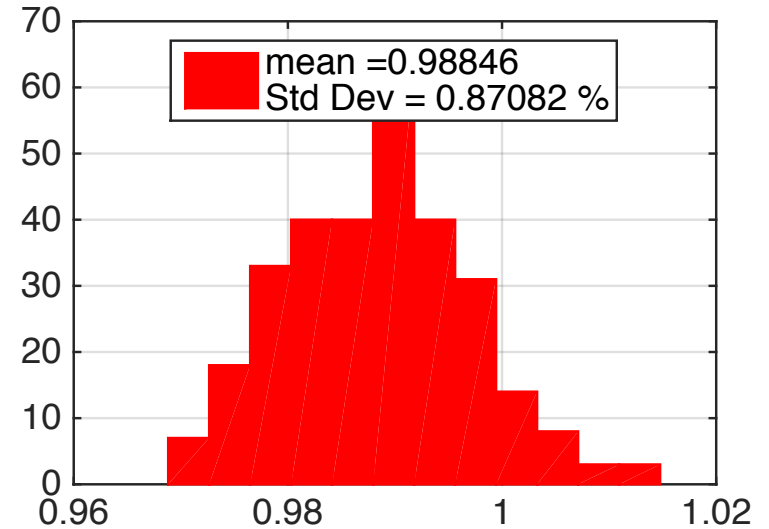
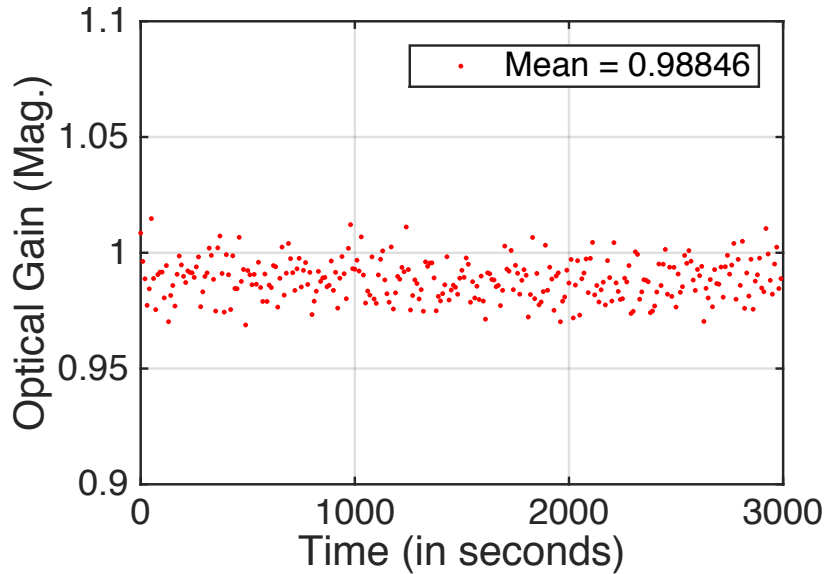
Frequency = 1001.3 Hz



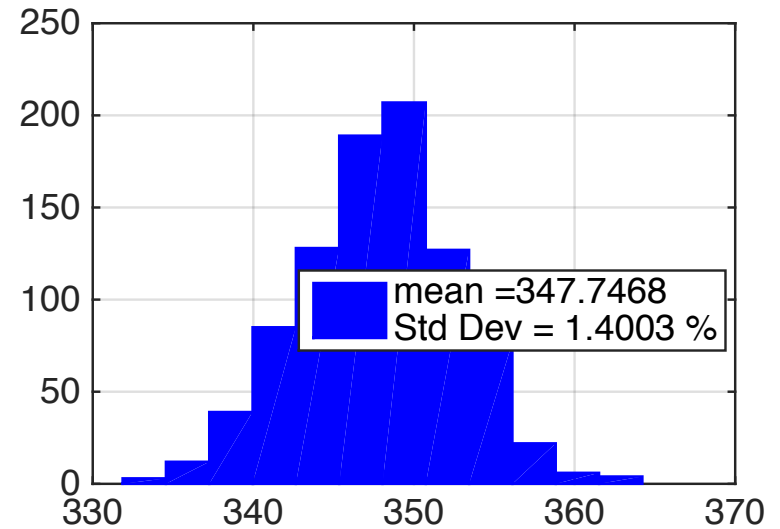
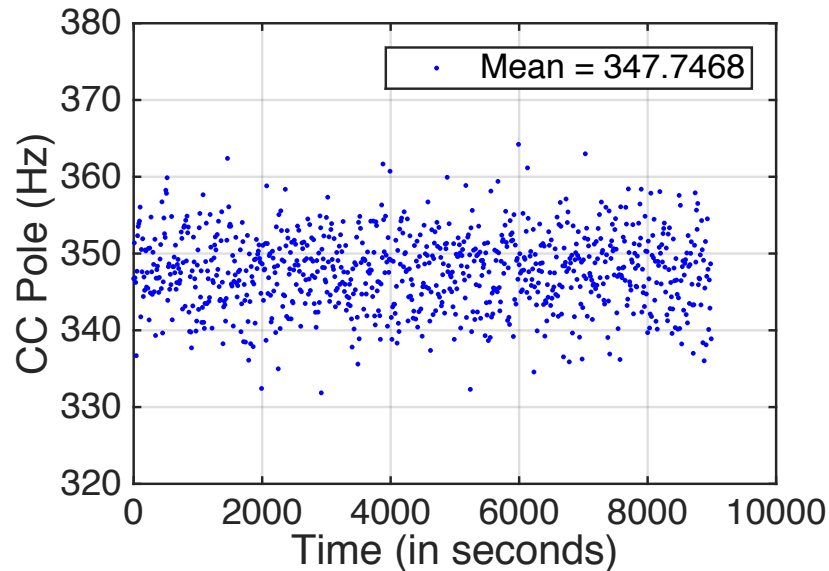
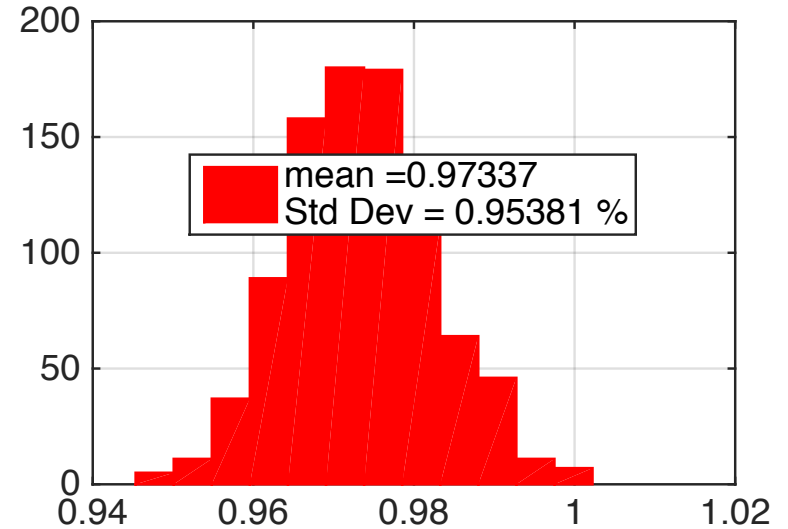
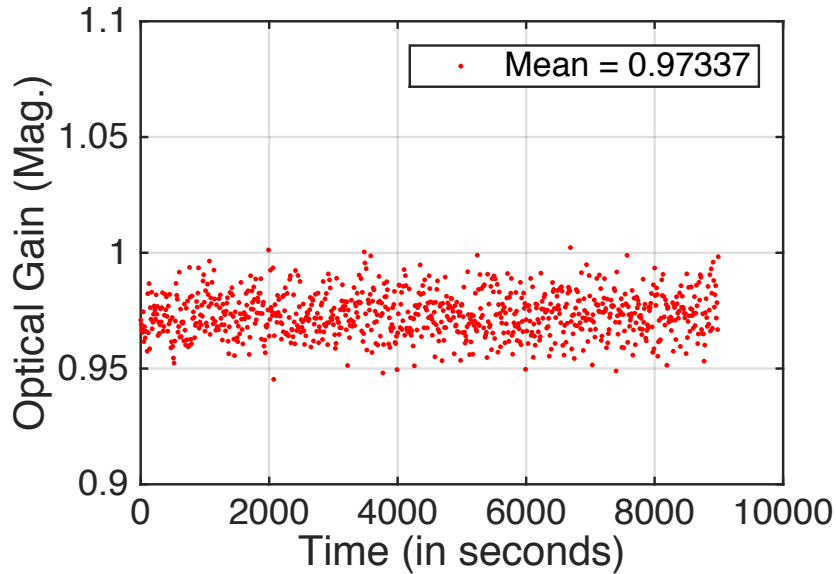
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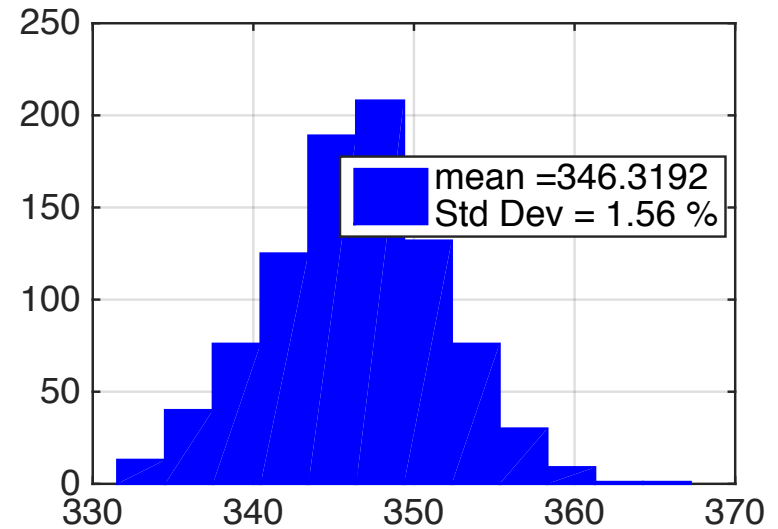
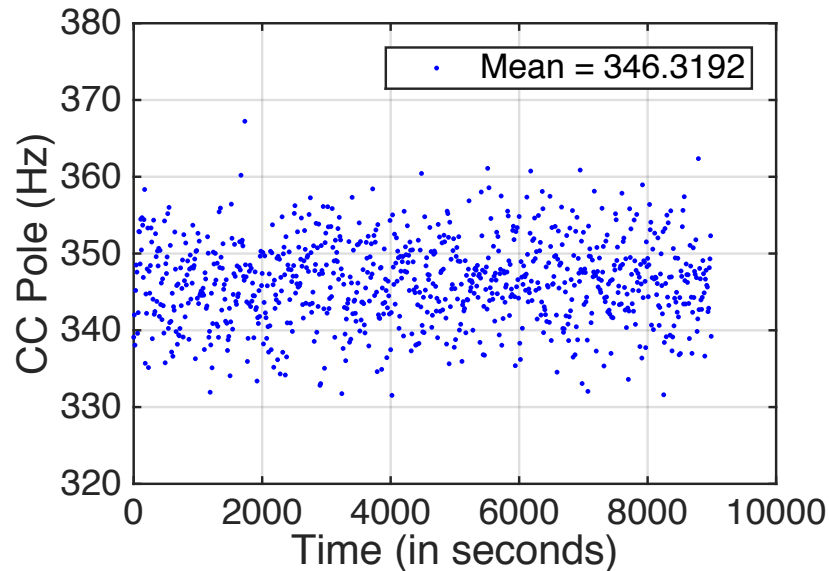
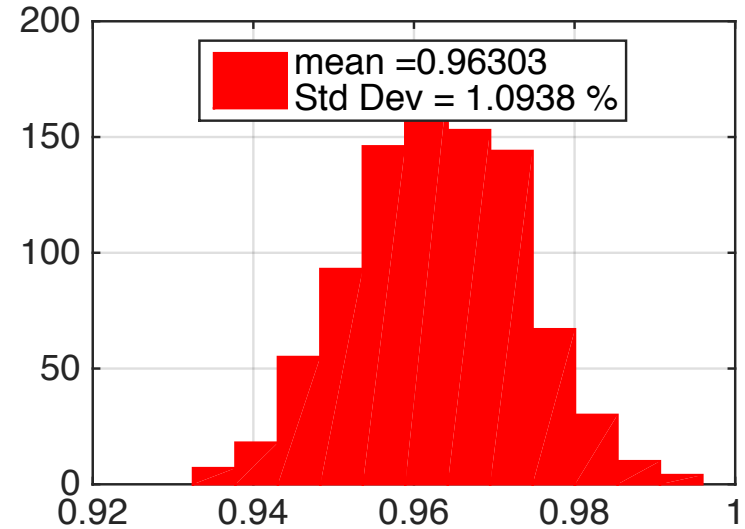
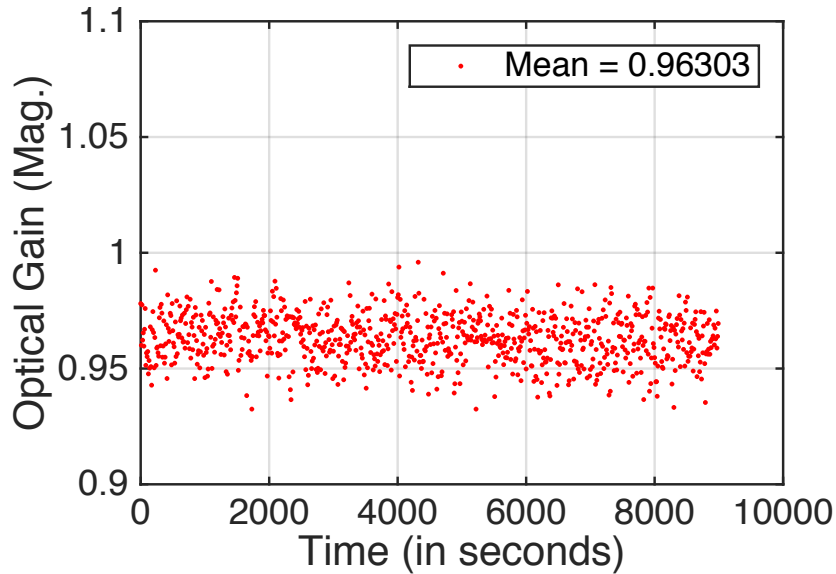
Frequency = 2001.3 Hz



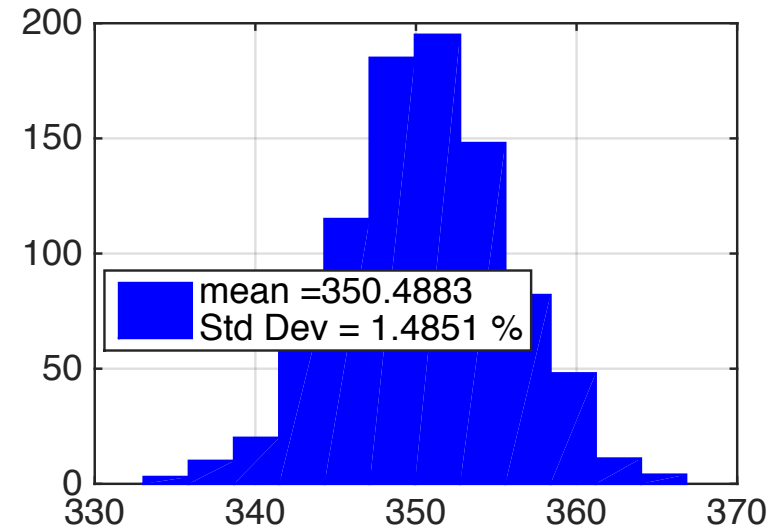
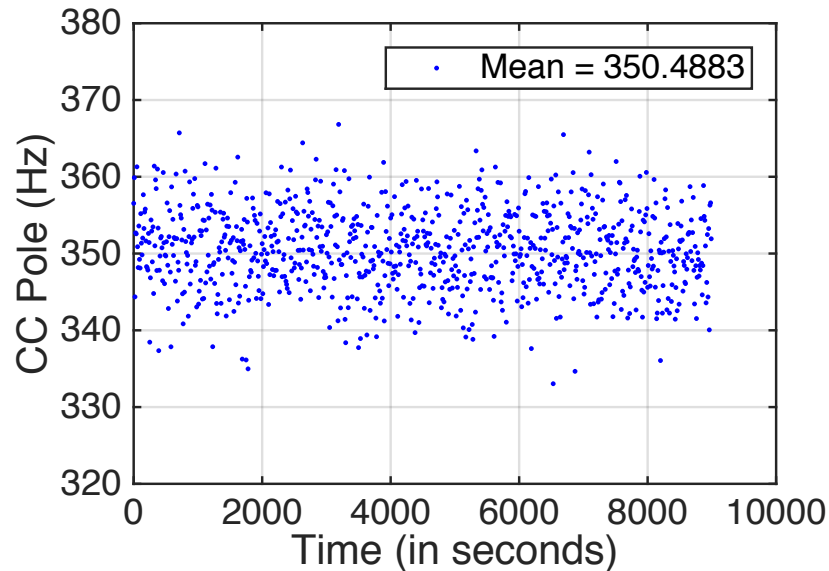
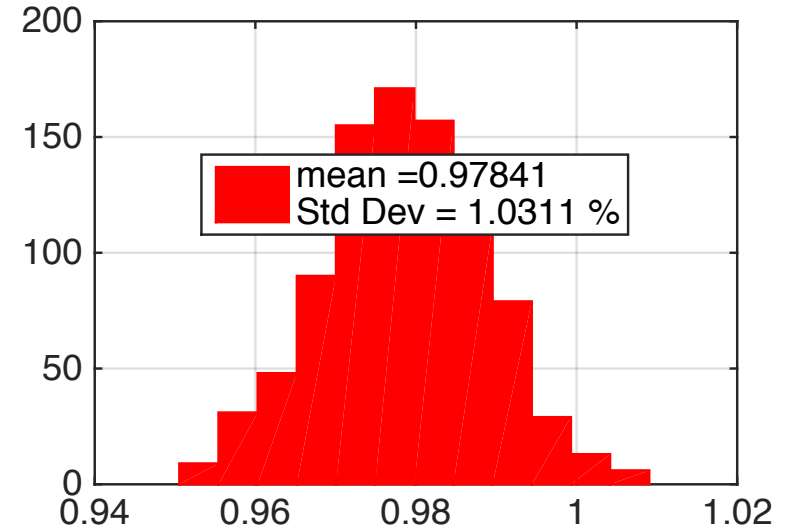
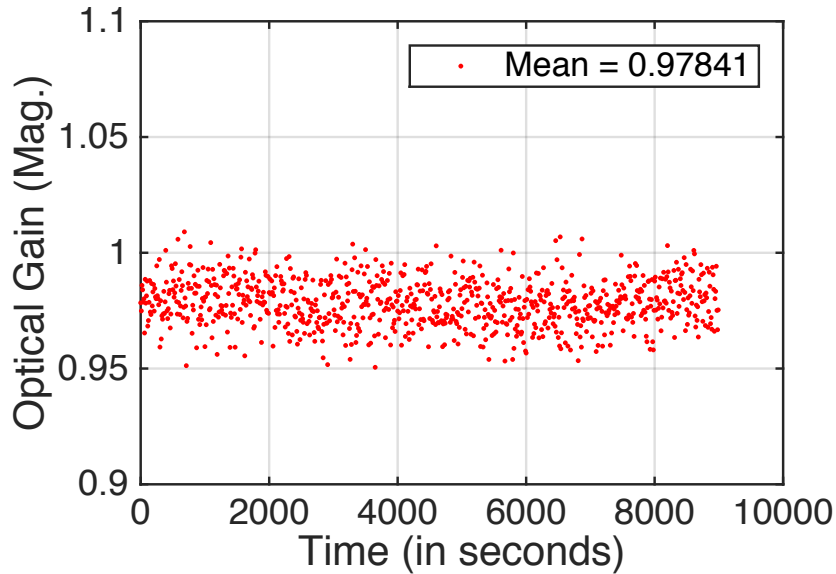
Frequency = 2501.3 Hz



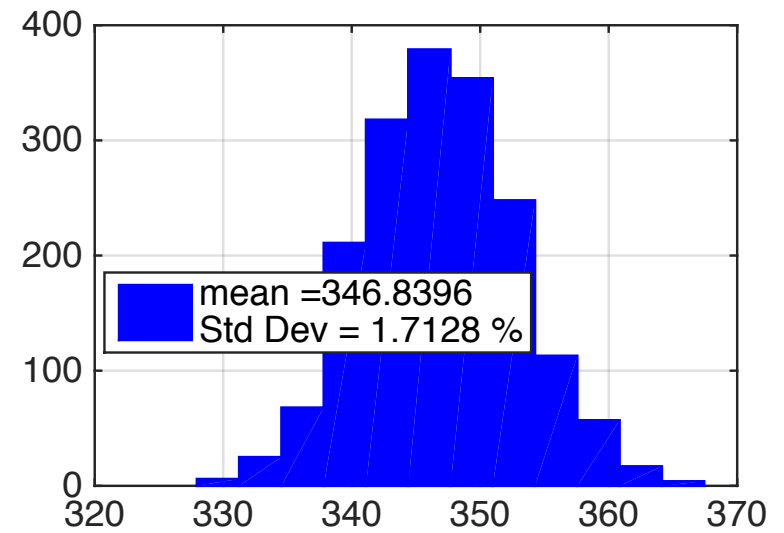
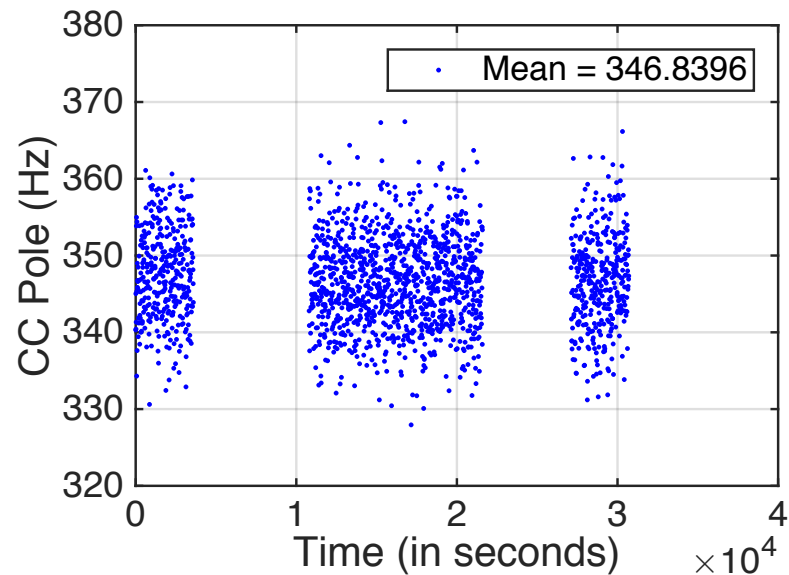
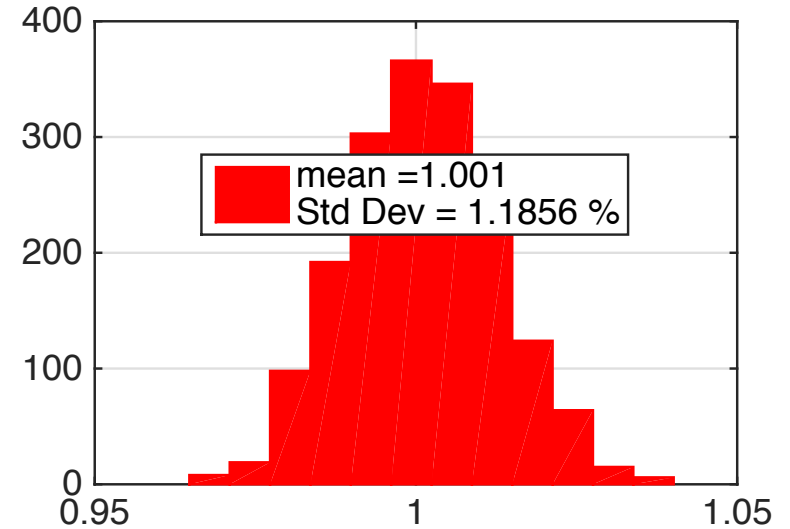
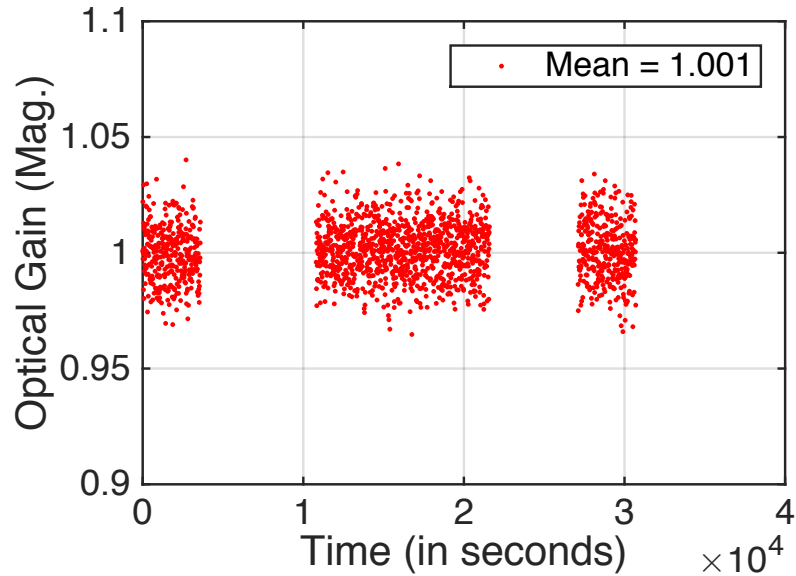
Frequency = 3001.3 Hz



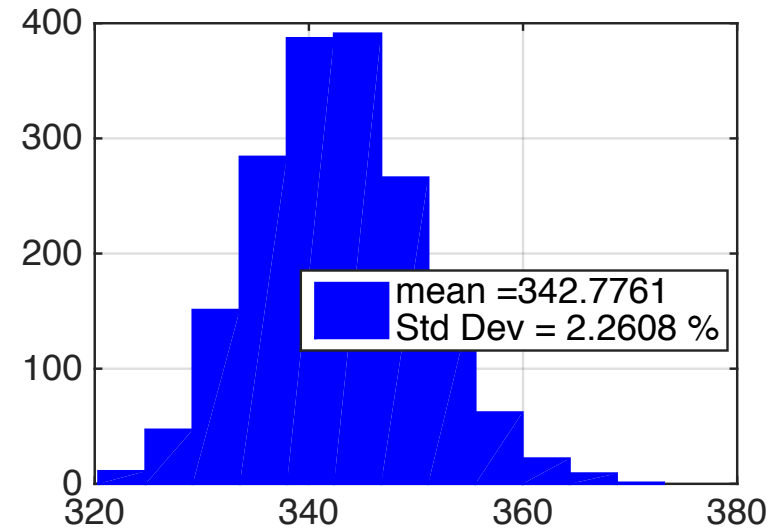
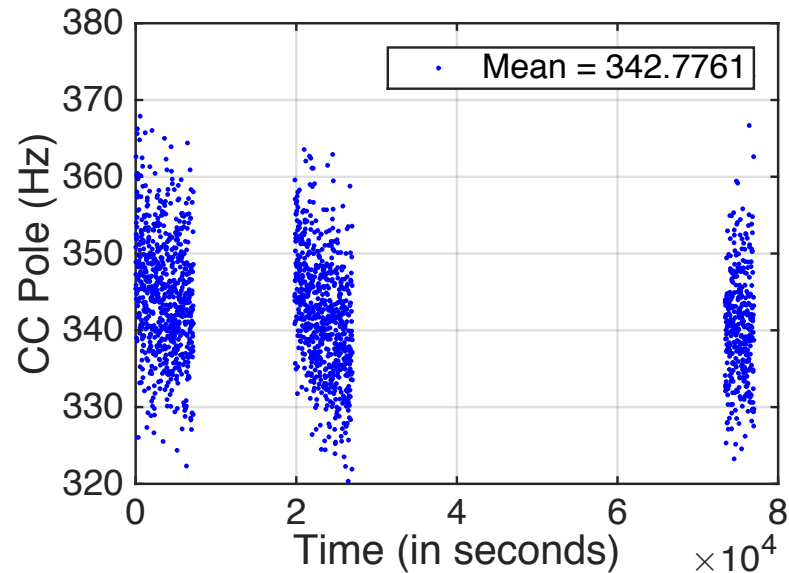
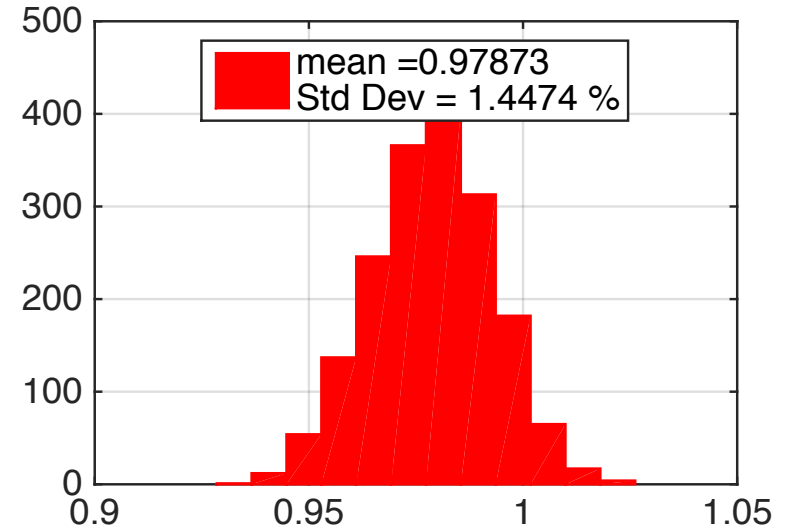
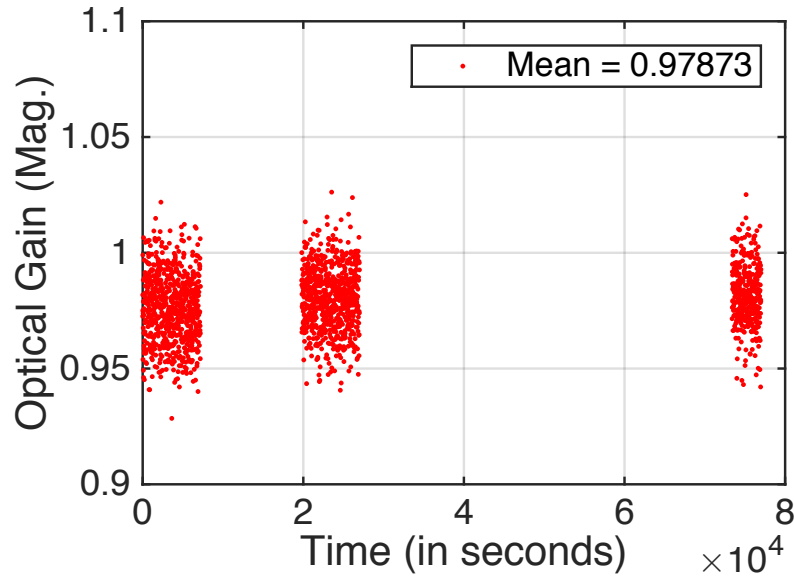
Frequency = 3501.3 Hz



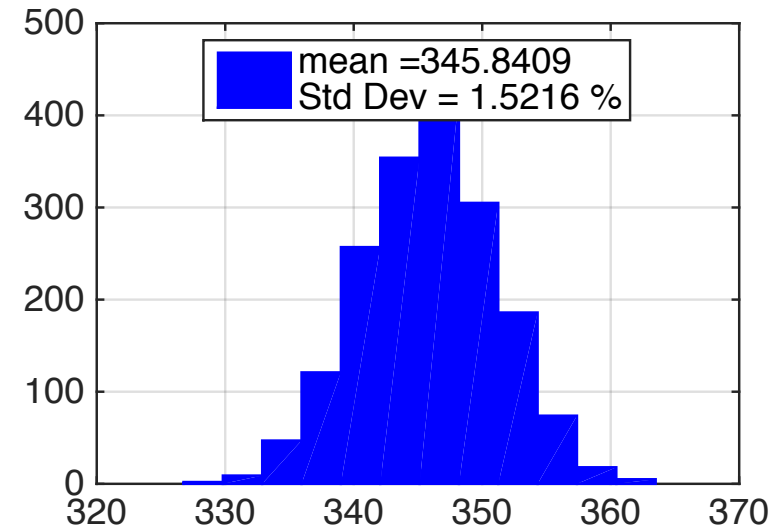
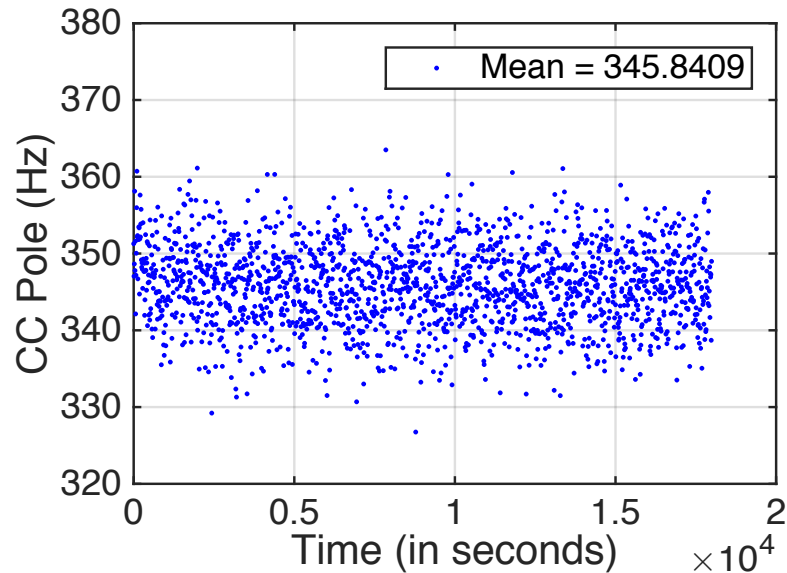
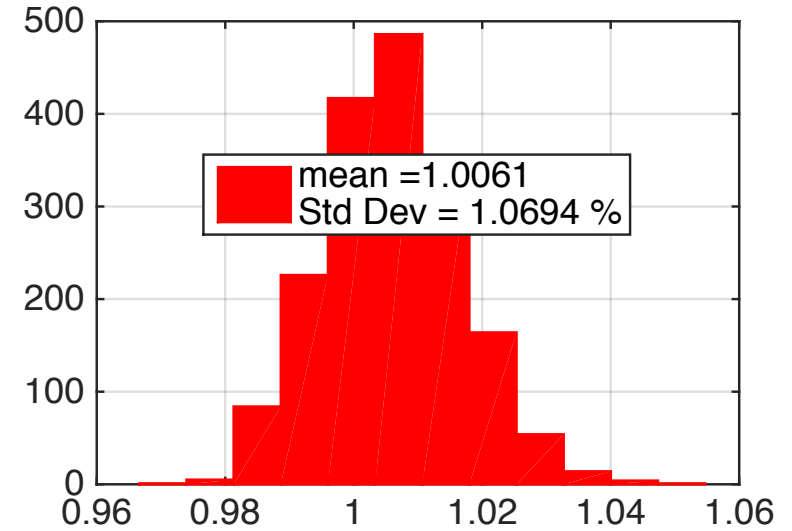
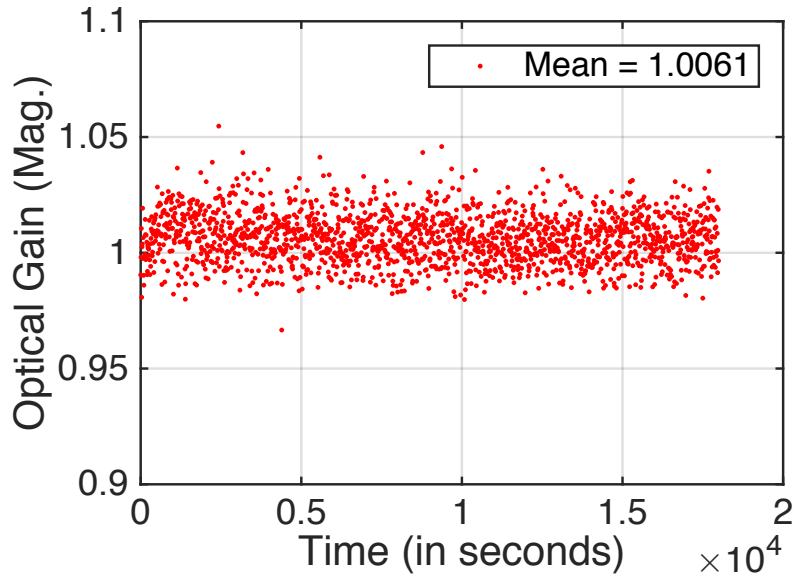
Frequency = 4001.3 Hz



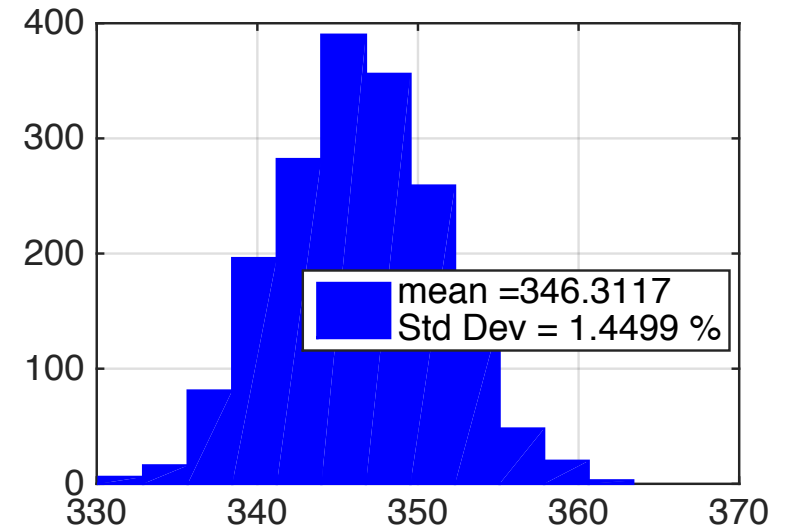
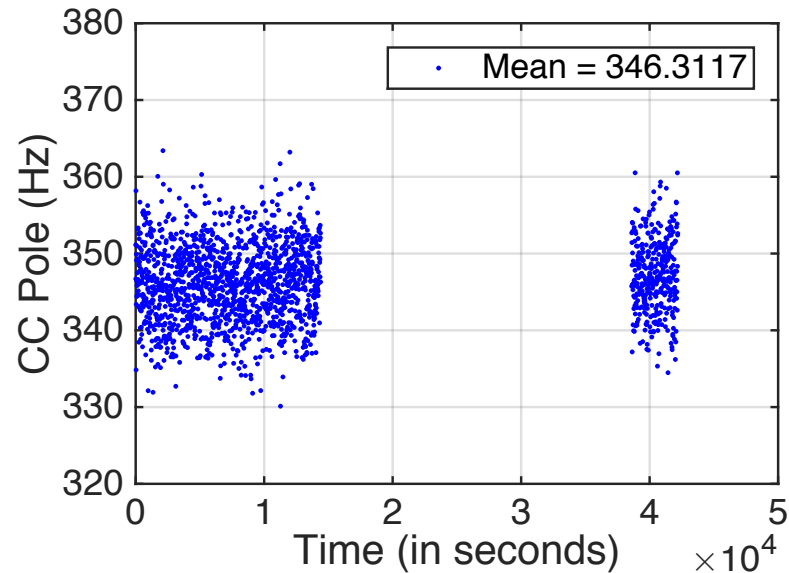
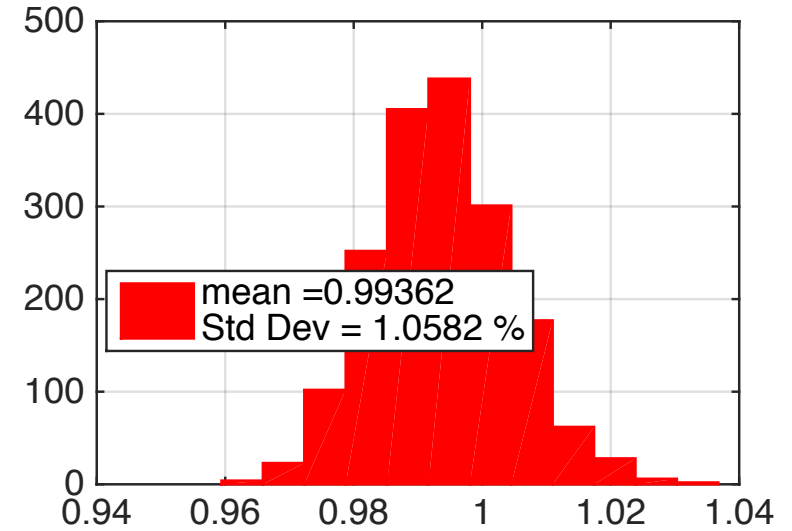
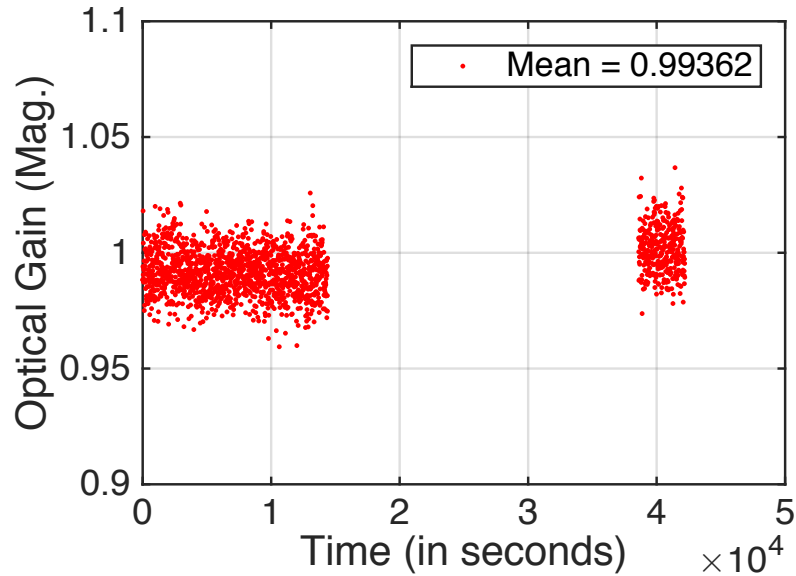
Frequency = 4301.3 Hz



Frequency = 4501.3 Hz



Frequency = 4801.3 Hz



Frequency = 5001.3 Hz

