

Force Coefficient Trends

| GENERATED FOR LHO_EndY

Report Generated on December 17, 2019

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1 About

The force coefficients are calculated according to

Force Coefficient = $[1/(GS*WSGS*TX(RX)WS)]*[2*\cos(\theta)/c]$

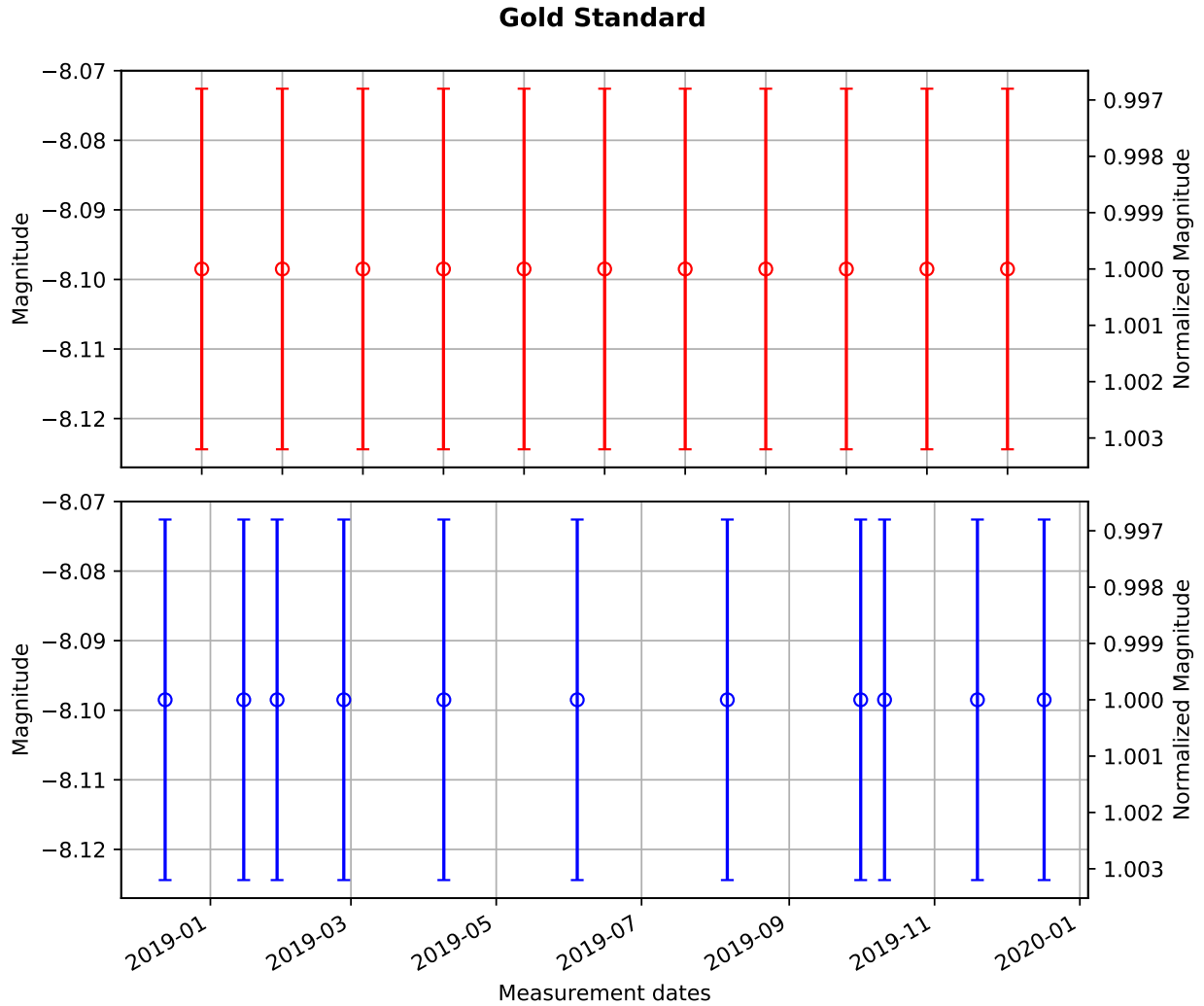
Angle of Incidence (θ) = 8.75 deg

Speed of light (c) = 299792458 m/s

2 Gold Standard (ρ_{GS})

List of Measurements

Date	GS $\pm$ SE_GS	Normalized
D20181213	-8.098500 $\pm$ -0.025915	(1 $\pm$ 0.003200)
D20190115	-8.098500 $\pm$ -0.025915	(1 $\pm$ 0.003200)
D20190129	-8.098500 $\pm$ -0.025915	(1 $\pm$ 0.003200)
D20190226	-8.098500 $\pm$ -0.025915	(1 $\pm$ 0.003200)
D20190409	-8.098500 $\pm$ -0.025915	(1 $\pm$ 0.003200)
D20190604	-8.098500 $\pm$ -0.025915	(1 $\pm$ 0.003200)
D20190806	-8.098500 $\pm$ -0.025915	(1 $\pm$ 0.003200)
D20191001	-8.098500 $\pm$ -0.025915	(1 $\pm$ 0.003200)
D20191011	-8.098500 $\pm$ -0.025915	(1 $\pm$ 0.003200)
D20191119	-8.098500 $\pm$ -0.025915	(1 $\pm$ 0.003200)
D20191217	-8.098500 $\pm$ -0.025915	(1 $\pm$ 0.003200)



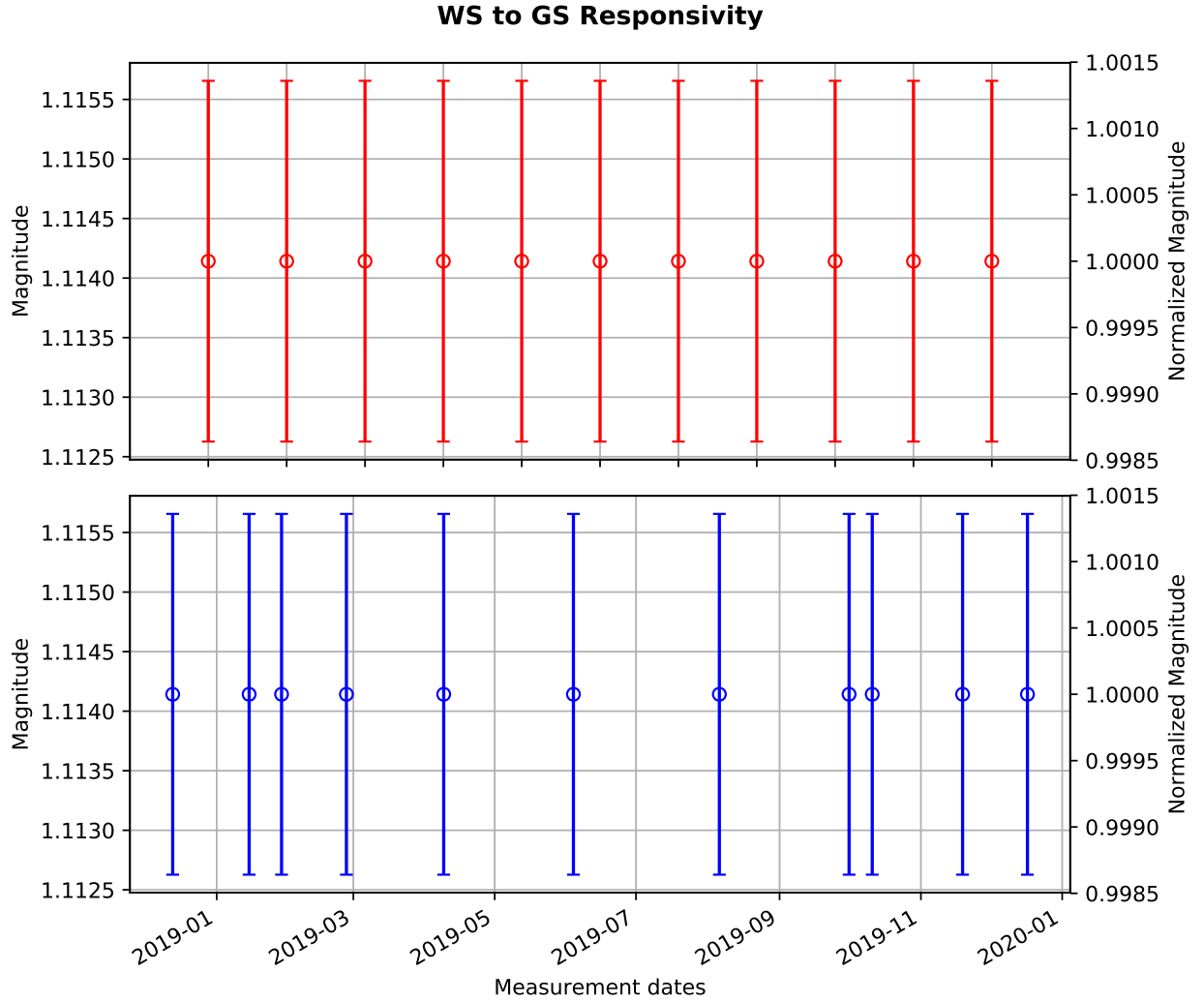
Summary of Gold Standard

Mean value:	-8.098500
Standard deviation:	0.000000
Standard error:	0.000000
Relative Standard error:	0.000000

3 WS to GS Responsivity (α_{WG})

List of Measurements

Date	WSGS $\pm$ SE_WSGS	Normalized
D20181213	1.114142 $\pm$ 0.001514	(1 $\pm$ 0.001359)
D20190115	1.114142 $\pm$ 0.001514	(1 $\pm$ 0.001359)
D20190129	1.114142 $\pm$ 0.001514	(1 $\pm$ 0.001359)
D20190226	1.114142 $\pm$ 0.001514	(1 $\pm$ 0.001359)
D20190409	1.114142 $\pm$ 0.001514	(1 $\pm$ 0.001359)
D20190604	1.114142 $\pm$ 0.001514	(1 $\pm$ 0.001359)
D20190806	1.114142 $\pm$ 0.001514	(1 $\pm$ 0.001359)
D20191001	1.114142 $\pm$ 0.001514	(1 $\pm$ 0.001359)
D20191011	1.114142 $\pm$ 0.001514	(1 $\pm$ 0.001359)
D20191119	1.114142 $\pm$ 0.001514	(1 $\pm$ 0.001359)
D20191217	1.114142 $\pm$ 0.001514	(1 $\pm$ 0.001359)



Summary of WS to GS Responsivity

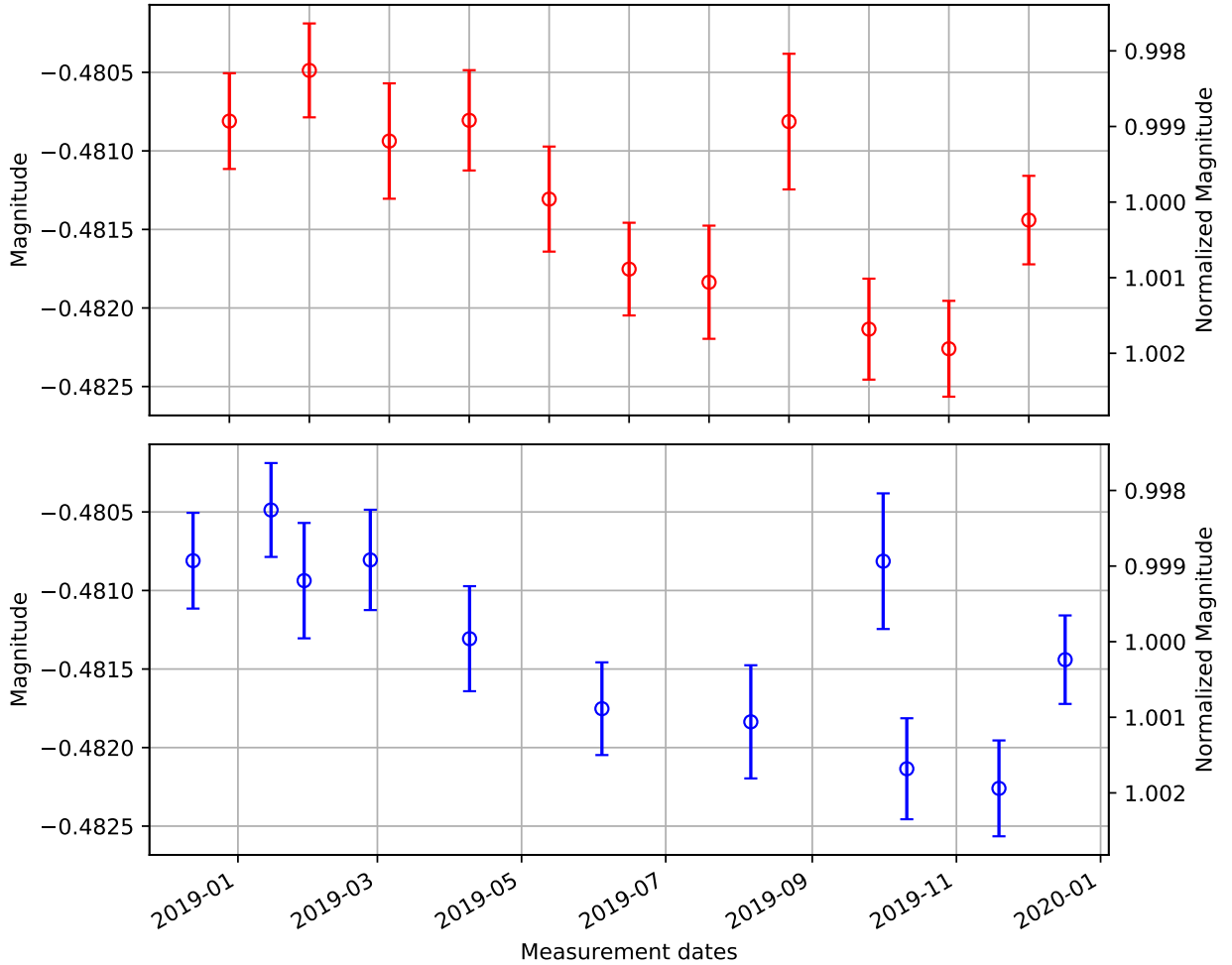
Mean value:	1.114142
Standard deviation:	0.000000
Standard error:	0.000000
Relative Standard error:	0.000000

4 TxPD to WS Responsivity (α_{TW})

List of Measurements

Date	TXWS $\pm$ SE_TXWS	Normalized
D20181213	-0.480810 $\pm$ 0.000305	(1 $\pm$ -0.000634)
D20190115	-0.480488 $\pm$ 0.000299	(1 $\pm$ -0.000622)
D20190129	-0.480937 $\pm$ 0.000367	(1 $\pm$ -0.000764)
D20190226	-0.480805 $\pm$ 0.000319	(1 $\pm$ -0.000664)
D20190409	-0.481307 $\pm$ 0.000334	(1 $\pm$ -0.000695)
D20190604	-0.481753 $\pm$ 0.000295	(1 $\pm$ -0.000613)
D20190806	-0.481836 $\pm$ 0.000360	(1 $\pm$ -0.000748)
D20191001	-0.480813 $\pm$ 0.000432	(1 $\pm$ -0.000898)
D20191011	-0.482135 $\pm$ 0.000321	(1 $\pm$ -0.000667)
D20191119	-0.482260 $\pm$ 0.000305	(1 $\pm$ -0.000633)
D20191217	-0.481440 $\pm$ 0.000282	(1 $\pm$ -0.000585)

TxPD to GS Responsivity



Summary of TxPD to GS Responsivity

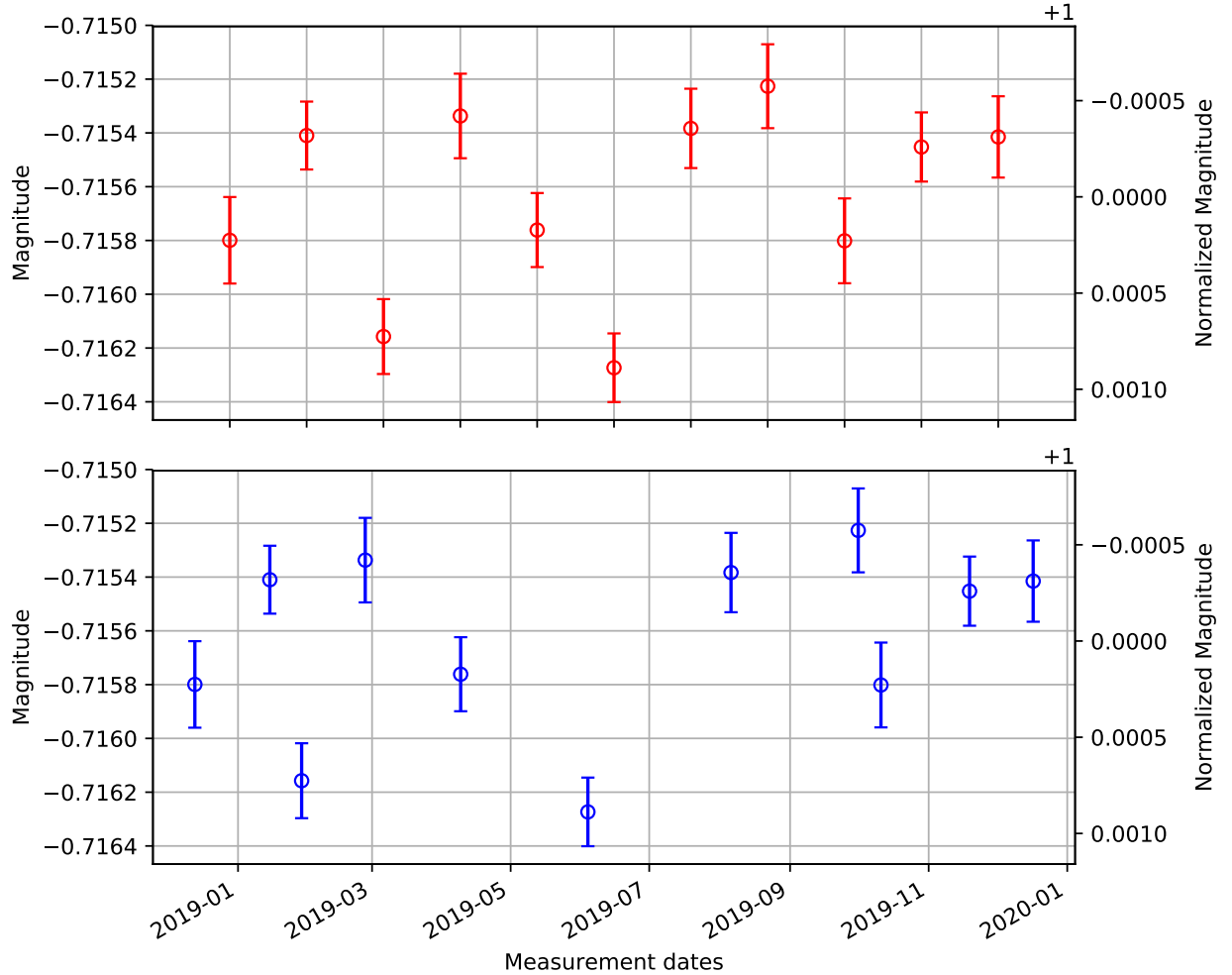
Mean value:	-0.481326
Standard deviation:	0.000603
Standard error:	0.000190
Relative Standard error:	0.000396

5 RxPD to WS Responsivity (α_{RW})

List of Measurements

Date	RXWS $\pm$ SE_RXWS	Normalized
D20181213	-0.715799 $\pm$ 0.000161	(1 $\pm$ -0.000225)
D20190115	-0.715410 $\pm$ 0.000126	(1 $\pm$ -0.000177)
D20190129	-0.716157 $\pm$ 0.000139	(1 $\pm$ -0.000194)
D20190226	-0.715337 $\pm$ 0.000157	(1 $\pm$ -0.000220)
D20190409	-0.715761 $\pm$ 0.000138	(1 $\pm$ -0.000192)
D20190604	-0.716273 $\pm$ 0.000128	(1 $\pm$ -0.000178)
D20190806	-0.715383 $\pm$ 0.000148	(1 $\pm$ -0.000206)
D20191001	-0.715226 $\pm$ 0.000156	(1 $\pm$ -0.000218)
D20191011	-0.715801 $\pm$ 0.000158	(1 $\pm$ -0.000220)
D20191119	-0.715452 $\pm$ 0.000129	(1 $\pm$ -0.000180)
D20191217	-0.715415 $\pm$ 0.000151	(1 $\pm$ -0.000211)

RxPD to GS Responsivity



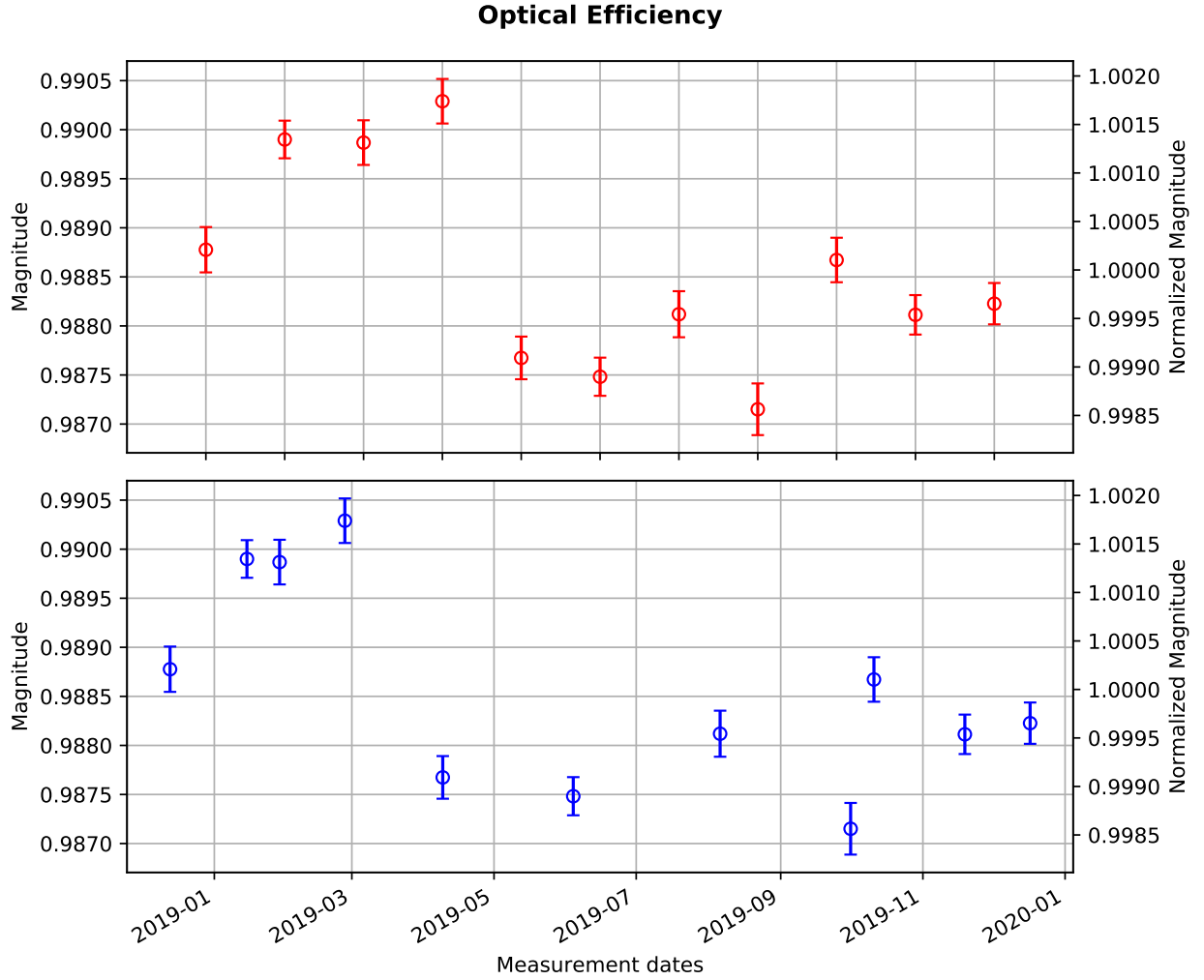
Summary of RxPD to GS Responsivity

Mean value:	-0.715638
Standard deviation:	0.000347
Standard error:	0.000110
Relative Standard error:	0.000153

6 Optical Efficiency (e)

List of Measurements

Date	$e \pm SE_e$	Normalized
D20181213	0.988777 ± 0.000231	(1 ± 0.000234)
D20190115	0.989900 ± 0.000192	(1 ± 0.000194)
D20190129	0.989868 ± 0.000228	(1 ± 0.000230)
D20190226	0.990290 ± 0.000227	(1 ± 0.000229)
D20190409	0.987674 ± 0.000217	(1 ± 0.000220)
D20190604	0.987482 ± 0.000194	(1 ± 0.000197)
D20190806	0.988119 ± 0.000235	(1 ± 0.000238)
D20191001	0.987151 ± 0.000263	(1 ± 0.000267)
D20191011	0.988672 ± 0.000227	(1 ± 0.000229)
D20191119	0.988113 ± 0.000201	(1 ± 0.000204)
D20191217	0.988227 ± 0.000211	(1 ± 0.000213)



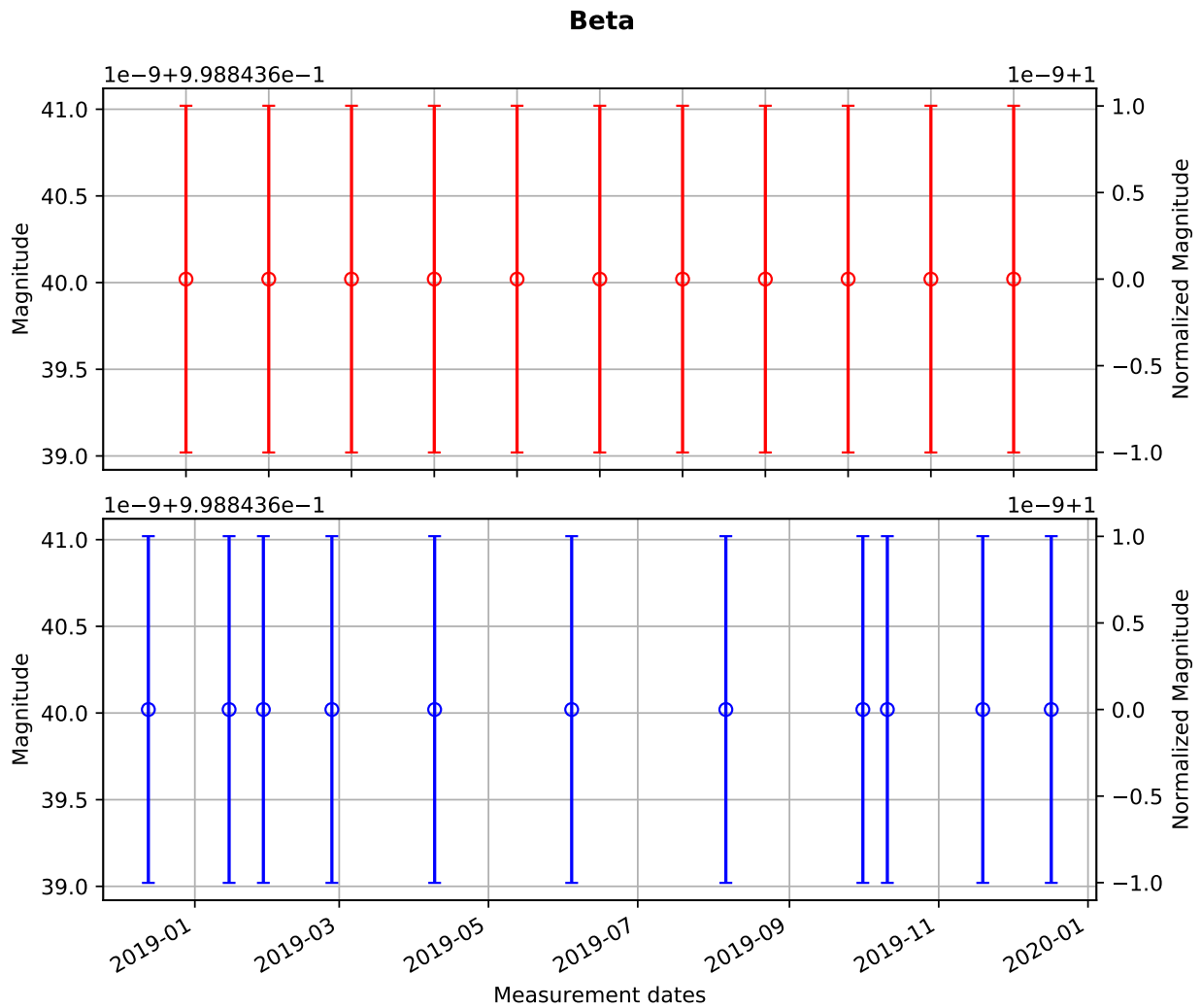
Summary of Optical Efficiency

Mean value:	0.988570
Standard deviation:	0.001049
Standard error:	0.000331
Relative Standard error:	0.000335

7 Beta (β)

List of Measurements

Date	beta $\pm$ SE_beta	Normalized
D20181213	0.998844 $\pm$ 0.000000	(1 $\pm$ 0.000000)
D20190115	0.998844 $\pm$ 0.000000	(1 $\pm$ 0.000000)
D20190129	0.998844 $\pm$ 0.000000	(1 $\pm$ 0.000000)
D20190226	0.998844 $\pm$ 0.000000	(1 $\pm$ 0.000000)
D20190409	0.998844 $\pm$ 0.000000	(1 $\pm$ 0.000000)
D20190604	0.998844 $\pm$ 0.000000	(1 $\pm$ 0.000000)
D20190806	0.998844 $\pm$ 0.000000	(1 $\pm$ 0.000000)
D20191001	0.998844 $\pm$ 0.000000	(1 $\pm$ 0.000000)
D20191011	0.998844 $\pm$ 0.000000	(1 $\pm$ 0.000000)
D20191119	0.998844 $\pm$ 0.000000	(1 $\pm$ 0.000000)
D20191217	0.998844 $\pm$ 0.000000	(1 $\pm$ 0.000000)



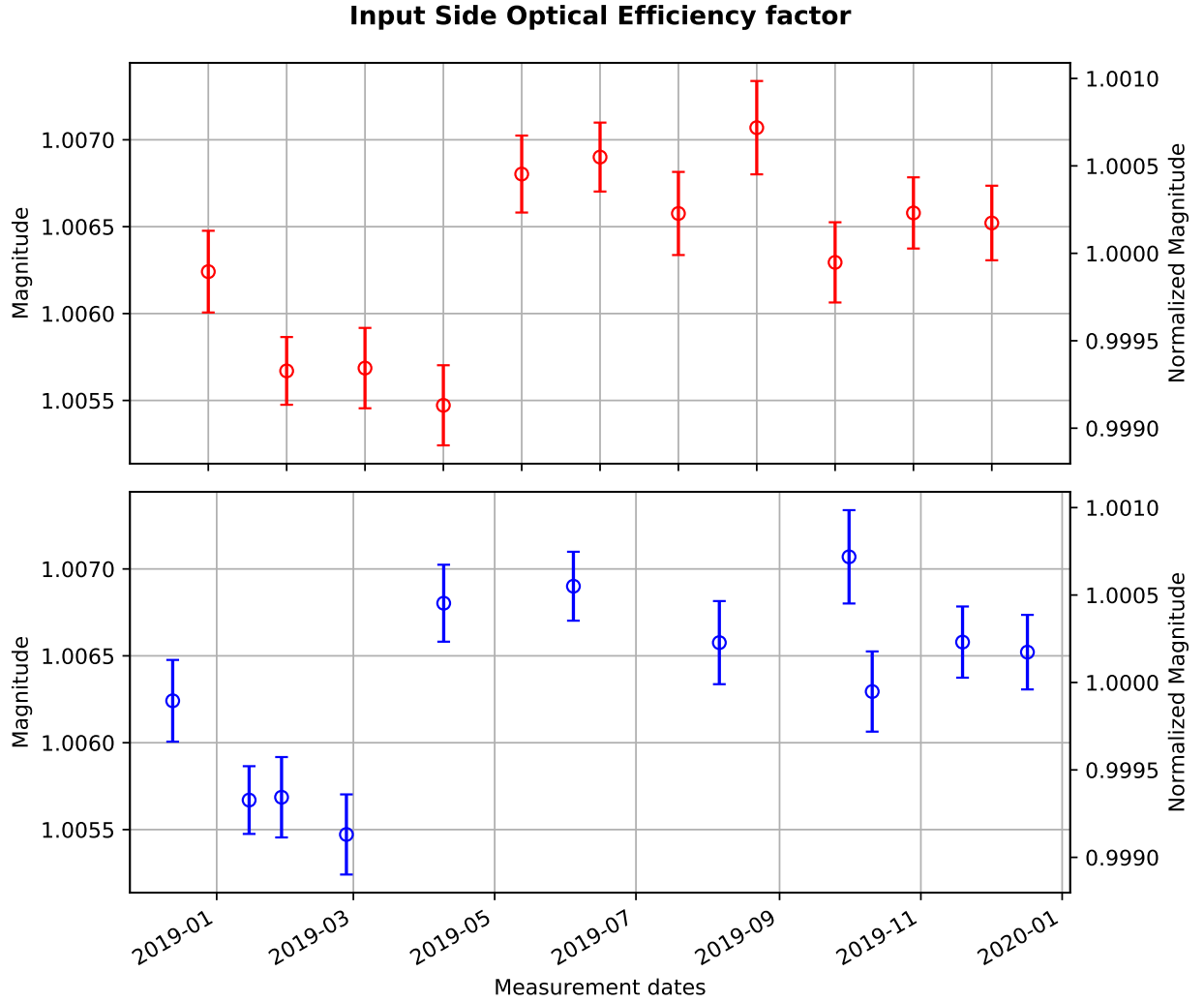
Summary of Beta

Mean value:	0.998844
Standard deviation:	0.000000
Standard error:	0.000000
Relative Standard error:	0.000000

8 Input Optical efficiency factor ($\mathcal{E}_T$)

List of Measurements

Date	E_T $\pm$ SE_E_T	Normalized
D20181213	1.006241 $\pm$ 0.000235	(1 $\pm$ 0.000234)
D20190115	1.005670 $\pm$ 0.000195	(1 $\pm$ 0.000194)
D20190129	1.005686 $\pm$ 0.000231	(1 $\pm$ 0.000230)
D20190226	1.005472 $\pm$ 0.000231	(1 $\pm$ 0.000229)
D20190409	1.006803 $\pm$ 0.000221	(1 $\pm$ 0.000220)
D20190604	1.006901 $\pm$ 0.000198	(1 $\pm$ 0.000197)
D20190806	1.006576 $\pm$ 0.000239	(1 $\pm$ 0.000238)
D20191001	1.007070 $\pm$ 0.000269	(1 $\pm$ 0.000267)
D20191011	1.006295 $\pm$ 0.000231	(1 $\pm$ 0.000229)
D20191119	1.006579 $\pm$ 0.000205	(1 $\pm$ 0.000204)
D20191217	1.006521 $\pm$ 0.000215	(1 $\pm$ 0.000213)

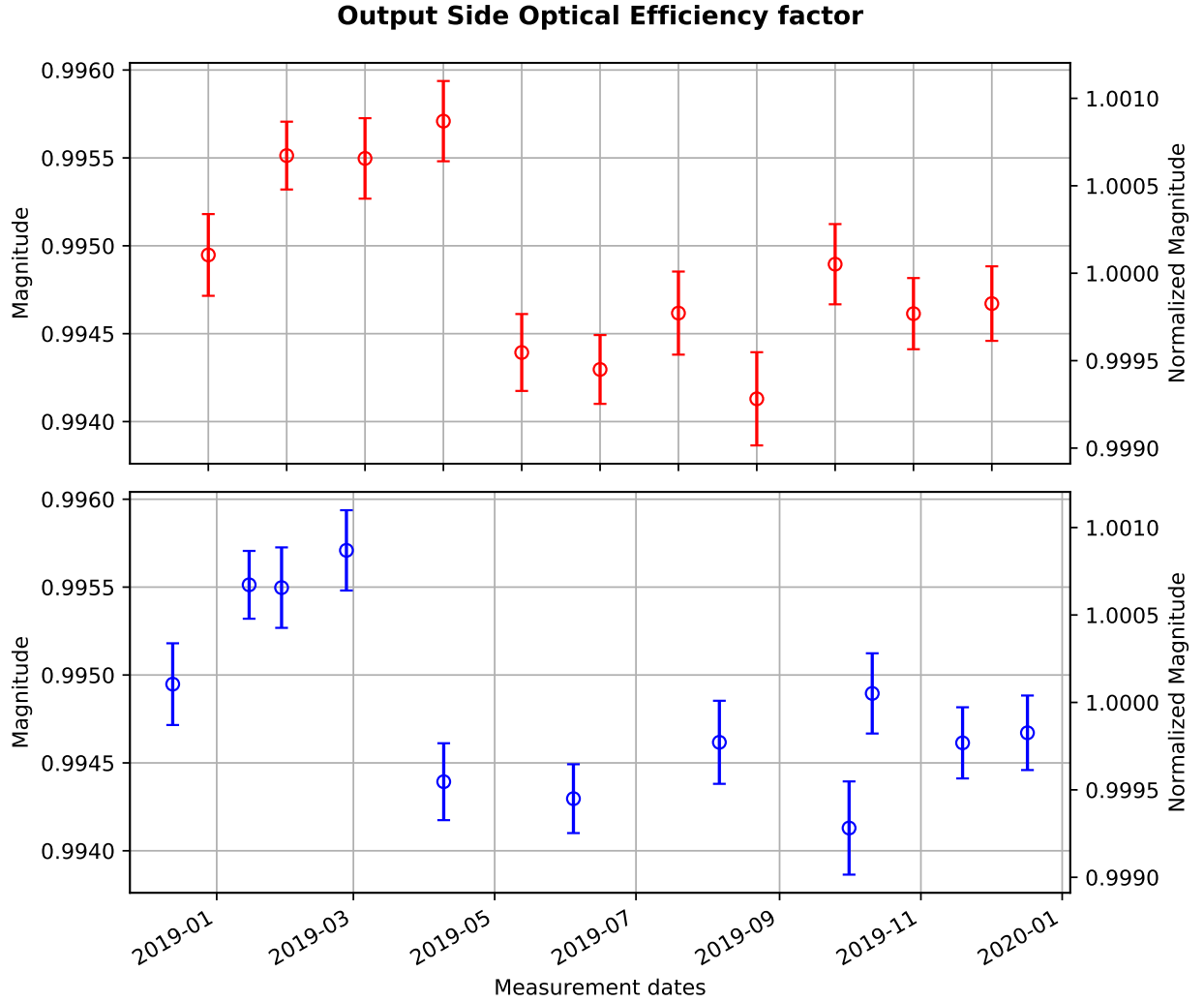


Summary of Input Side Optical Efficiency factor		
Mean value:	1.006347	
Standard deviation:	0.000534	
Standard error:	0.000169	
Relative Standard error:	0.000167	

9 Output Optical efficiency factor ($\mathcal{E}_R$)

List of Measurements

Date	E_R $\pm$ SE_E_R	Normalized
D20181213	0.994948 $\pm$ 0.000232	(1 $\pm$ 0.000234)
D20190115	0.995513 $\pm$ 0.000193	(1 $\pm$ 0.000194)
D20190129	0.995497 $\pm$ 0.000229	(1 $\pm$ 0.000230)
D20190226	0.995709 $\pm$ 0.000228	(1 $\pm$ 0.000229)
D20190409	0.994393 $\pm$ 0.000219	(1 $\pm$ 0.000220)
D20190604	0.994296 $\pm$ 0.000196	(1 $\pm$ 0.000197)
D20190806	0.994617 $\pm$ 0.000236	(1 $\pm$ 0.000238)
D20191001	0.994129 $\pm$ 0.000265	(1 $\pm$ 0.000267)
D20191011	0.994895 $\pm$ 0.000228	(1 $\pm$ 0.000229)
D20191119	0.994614 $\pm$ 0.000202	(1 $\pm$ 0.000204)
D20191217	0.994671 $\pm$ 0.000212	(1 $\pm$ 0.000213)

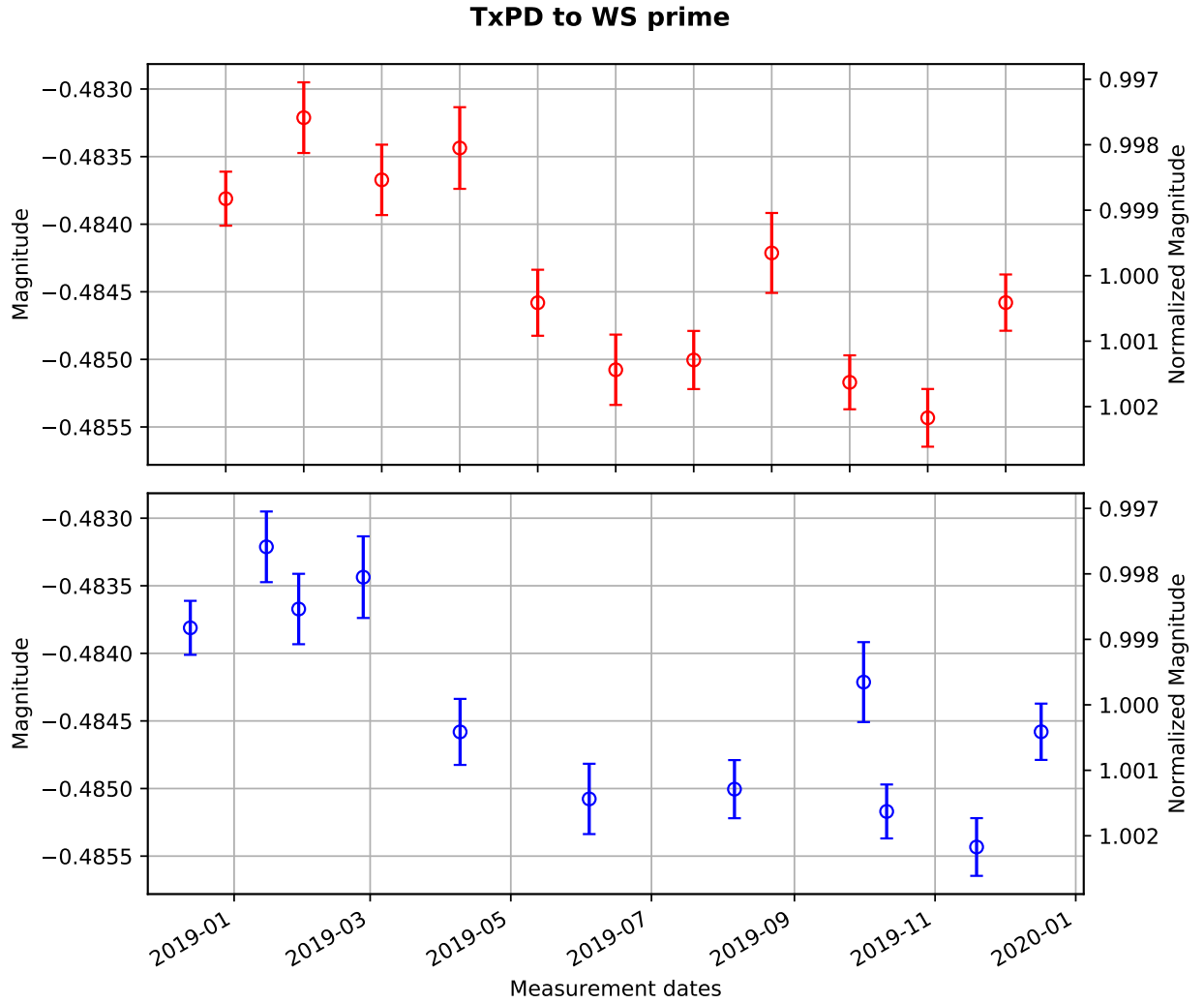


Summary of Output Side Optical Efficiency factor		
Mean value:	0.994844	
Standard deviation:	0.000528	
Standard error:	0.000167	
Relative Standard error:	0.000168	

10 TxPD to WS prime ($\alpha_{TW'}$)

List of Measurements

Date	alphaTXWS_prime $\pm$ SE_alphaTXWS_prime		
Normalized			
D20181213	-0.483811 $\pm$ -0.000200	(1 $\pm$ 0.000413)	
D20190115	-0.483212 $\pm$ -0.000261	(1 $\pm$ 0.000541)	
D20190129	-0.483672 $\pm$ -0.000260	(1 $\pm$ 0.000538)	
D20190226	-0.483436 $\pm$ -0.000302	(1 $\pm$ 0.000625)	
D20190409	-0.484581 $\pm$ -0.000244	(1 $\pm$ 0.000504)	
D20190604	-0.485077 $\pm$ -0.000260	(1 $\pm$ 0.000536)	
D20190806	-0.485005 $\pm$ -0.000215	(1 $\pm$ 0.000443)	
D20191001	-0.484213 $\pm$ -0.000296	(1 $\pm$ 0.000611)	
D20191011	-0.485170 $\pm$ -0.000200	(1 $\pm$ 0.000411)	
D20191119	-0.485433 $\pm$ -0.000214	(1 $\pm$ 0.000440)	
D20191217	-0.484580 $\pm$ -0.000208	(1 $\pm$ 0.000430)	



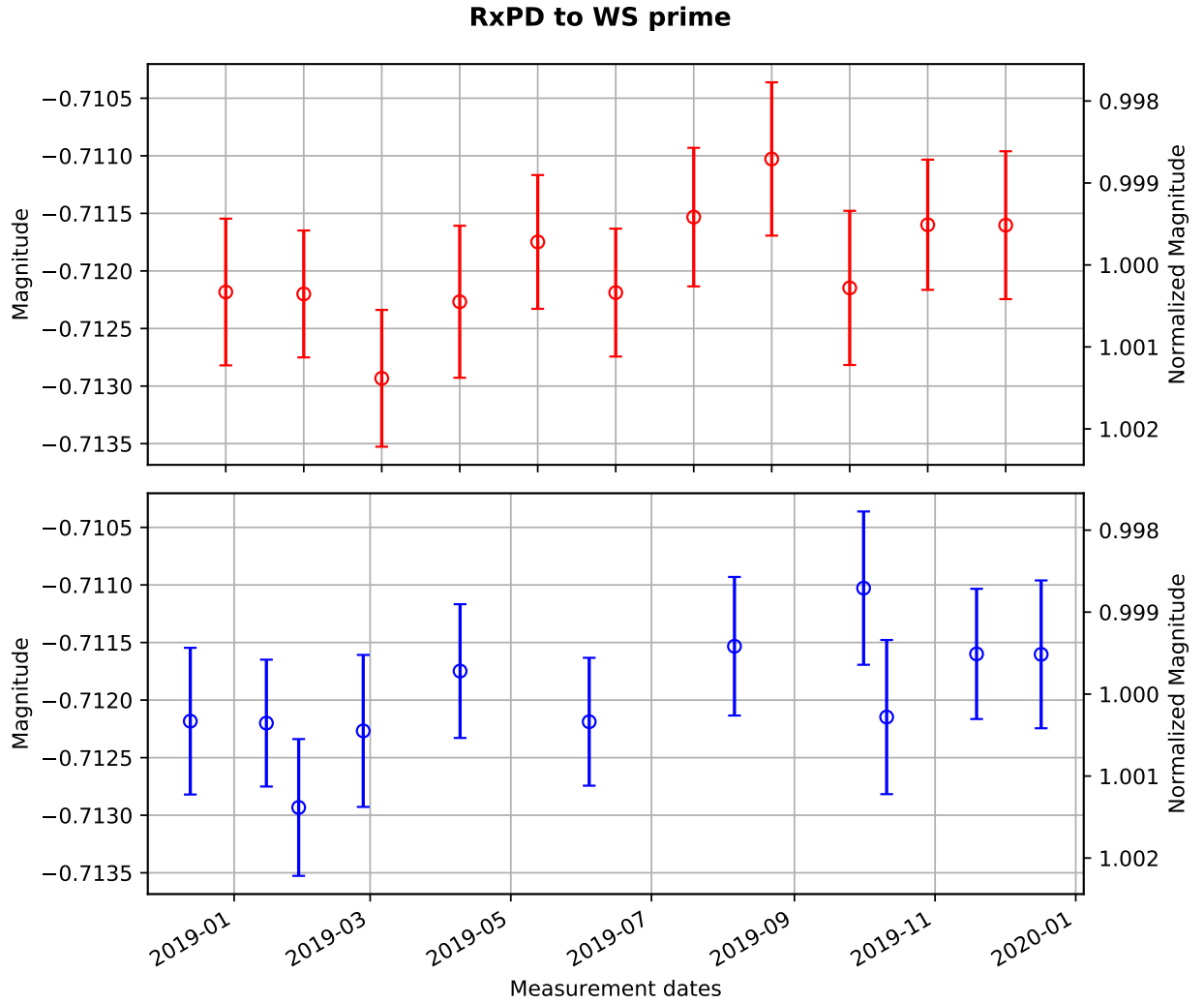
Summary of TxPD to WS prime

Mean value:	-0.484381
Standard deviation:	0.000761
Standard error:	0.000240
Relative Standard error:	0.000496

11 RxPD to WS prime (α_{RW}')

List of Measurements

Date	alphaRXWS_prime $\pm$ SE_alphaRXWS_prime		
Normalized			
D20181213	-0.712183 $\pm$ -0.000637	(1 $\pm$ 0.000895)	
D20190115	-0.712200 $\pm$ -0.000551	(1 $\pm$ 0.000774)	
D20190129	-0.712933 $\pm$ -0.000594	(1 $\pm$ 0.000833)	
D20190226	-0.712268 $\pm$ -0.000660	(1 $\pm$ 0.000927)	
D20190409	-0.711748 $\pm$ -0.000581	(1 $\pm$ 0.000816)	
D20190604	-0.712188 $\pm$ -0.000555	(1 $\pm$ 0.000780)	
D20190806	-0.711532 $\pm$ -0.000602	(1 $\pm$ 0.000846)	
D20191001	-0.711028 $\pm$ -0.000666	(1 $\pm$ 0.000936)	
D20191011	-0.712147 $\pm$ -0.000669	(1 $\pm$ 0.000940)	
D20191119	-0.711599 $\pm$ -0.000565	(1 $\pm$ 0.000795)	
D20191217	-0.711603 $\pm$ -0.000642	(1 $\pm$ 0.000902)	



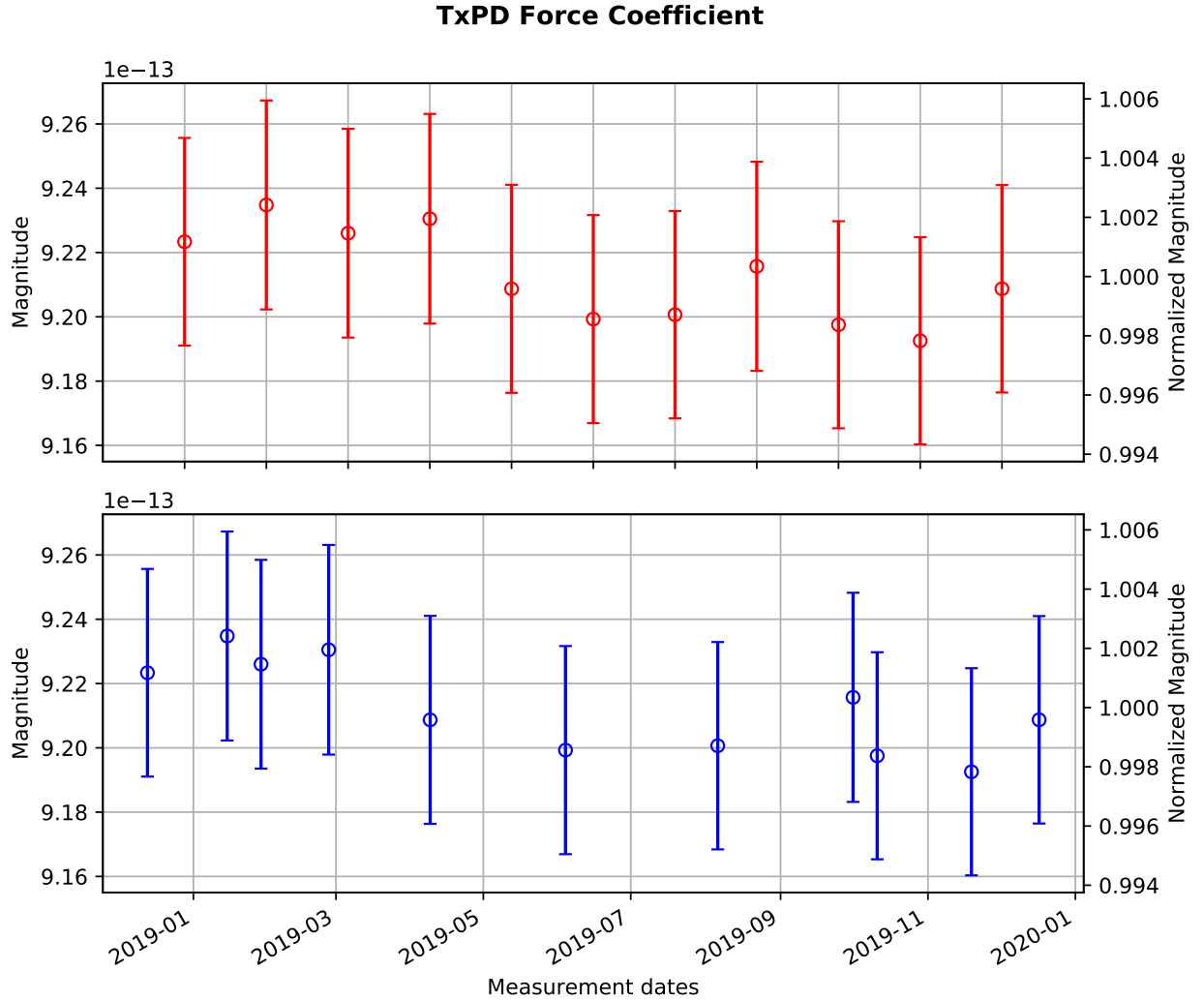
Summary of RxPD to WS prime

Mean value:	-0.711948
Standard deviation:	0.000509
Standard error:	0.000161
Relative Standard error:	0.000226

12 TxPD Force Coefficient (Γ_{TX})

List of Measurements

Date	FC_TXPD $\pm$ SE_FC_TXPD	Normalized
D20181213	9.223356e-13 $\pm$ 3.229741e-15	(1 $\pm$ 3.501698e-03)
D20190115	9.234796e-13 $\pm$ 3.249818e-15	(1 $\pm$ 3.519101e-03)
D20190129	9.226011e-13 $\pm$ 3.246372e-15	(1 $\pm$ 3.518717e-03)
D20190226	9.230509e-13 $\pm$ 3.261091e-15	(1 $\pm$ 3.532948e-03)
D20190409	9.208703e-13 $\pm$ 3.235571e-15	(1 $\pm$ 3.513602e-03)
D20190604	9.199290e-13 $\pm$ 3.236665e-15	(1 $\pm$ 3.518386e-03)
D20190806	9.200660e-13 $\pm$ 3.225227e-15	(1 $\pm$ 3.505430e-03)
D20191001	9.215709e-13 $\pm$ 3.253602e-15	(1 $\pm$ 3.530496e-03)
D20191011	9.197532e-13 $\pm$ 3.220522e-15	(1 $\pm$ 3.501506e-03)
D20191119	9.192550e-13 $\pm$ 3.221969e-15	(1 $\pm$ 3.504978e-03)
D20191217	9.208722e-13 $\pm$ 3.226476e-15	(1 $\pm$ 3.503717e-03)



Summary of TxPD Force Coefficient

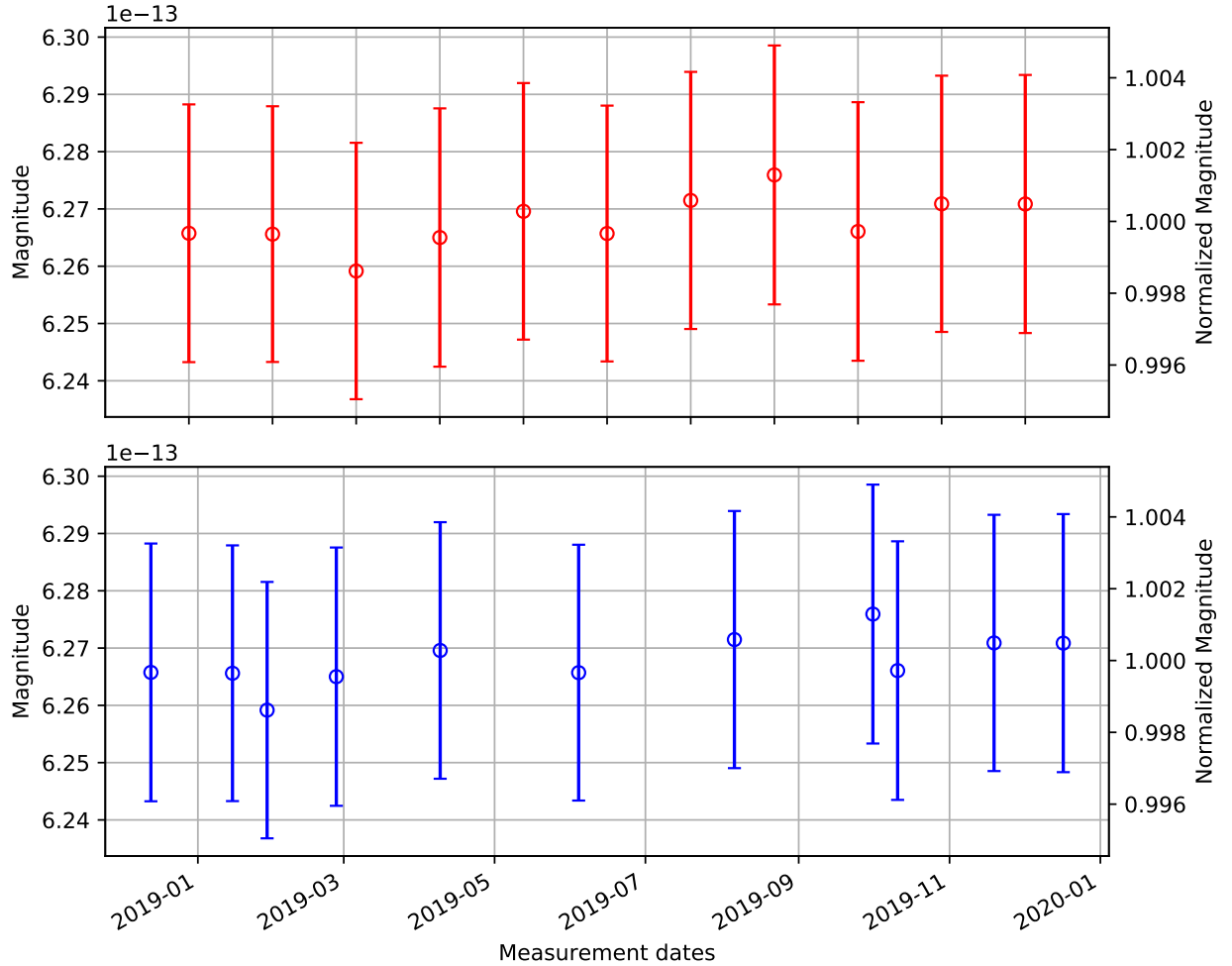
Mean value:	9.212531e-13
Standard deviation:	1.448270e-15
Standard error:	4.574411e-16
Relative Standard error:	4.965423e-04

13 RxPD Force Coefficient (Γ_{RX})

List of Measurements

Date	FC_RXPD $\pm$ SE_FC_RXPD	Normalized
D20181213	6.265753e-13 $\pm$ 2.249716e-15	(1 $\pm$ 3.590496e-03)
D20190115	6.265605e-13 $\pm$ 2.231988e-15	(1 $\pm$ 3.562286e-03)
D20190129	6.259166e-13 $\pm$ 2.238089e-15	(1 $\pm$ 3.575698e-03)
D20190226	6.265009e-13 $\pm$ 2.254554e-15	(1 $\pm$ 3.598644e-03)
D20190409	6.269583e-13 $\pm$ 2.239348e-15	(1 $\pm$ 3.571765e-03)
D20190604	6.265709e-13 $\pm$ 2.232867e-15	(1 $\pm$ 3.563630e-03)
D20190806	6.271483e-13 $\pm$ 2.244328e-15	(1 $\pm$ 3.578624e-03)
D20191001	6.275935e-13 $\pm$ 2.260035e-15	(1 $\pm$ 3.601113e-03)
D20191011	6.266067e-13 $\pm$ 2.257095e-15	(1 $\pm$ 3.602093e-03)
D20191119	6.270896e-13 $\pm$ 2.236759e-15	(1 $\pm$ 3.566889e-03)
D20191217	6.270863e-13 $\pm$ 2.252746e-15	(1 $\pm$ 3.592402e-03)

RxPD Force Coefficient



Summary of RxPD Force Coefficient

Mean value:	6.267824e-13
Standard deviation:	4.478865e-16
Standard error:	1.414665e-16
Relative Standard error:	2.257028e-04