
LHOX-End RxPD and TxPD Calibration Trends

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About

This document contains the Pcal PD (TxPD and RxPD) Calibration trends. The first six sections contain the six ratios measured at the end-station labeled as m1, m2m6. The section that follows contains the relevant information calculated from these measurements which include Optical Efficiency, Power Imbalance, TX/WS and RX/WS ratio.

Understanding Each Section

Each section contains a list of measurements with Magnitude, Standard Error (Std Err) and Relative Error (Rel Err) for each measurement. The list is followed by two plot figures with Magnitude on the first plot and the the Normalized Magnitude on the second. Each section ends with a summary that contains the weighted mean of all the measurement along with their Standard Deviation (Std Dev), Std Err and Rel Err where each of

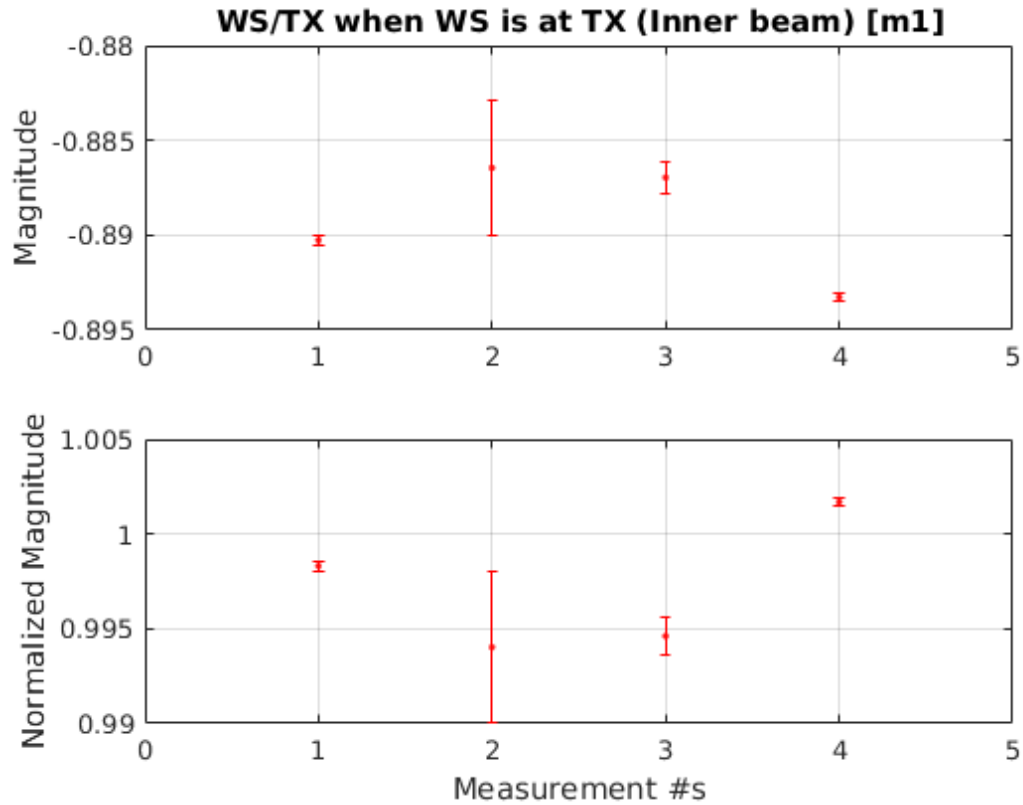
$Mean = \sum(x(i)*w(i))/\sum(w(i))$
 $Std\ Dev = \sqrt{\sum(w(i)*(x(i)-x_mean)^2)/((n-1)/n*\sum(w(i)))}$
 $Std\ Err = Std\ Dev/\sqrt{n}$
 $Rel\ Err = Std\ Err/Mean$

Report created on 23-Apr-2019

WS/TX Ratio when WS is at TX (Inner Beam)

List of Measurements

<i>Date</i>	<i>m1 ± SE_{m1}</i>	<i>Normalized</i>
<i>D20190122</i>	<i>-0.890272 ± 0.000242</i>	<i>(1 ± 0.000271)</i>
<i>D20190305</i>	<i>-0.886453 ± 0.003517</i>	<i>(1 ± 0.003968)</i>
<i>D20190312</i>	<i>-0.886971 ± 0.000843</i>	<i>(1 ± 0.000951)</i>
<i>D20190423</i>	<i>-0.893277 ± 0.000214</i>	<i>(1 ± 0.000239)</i>



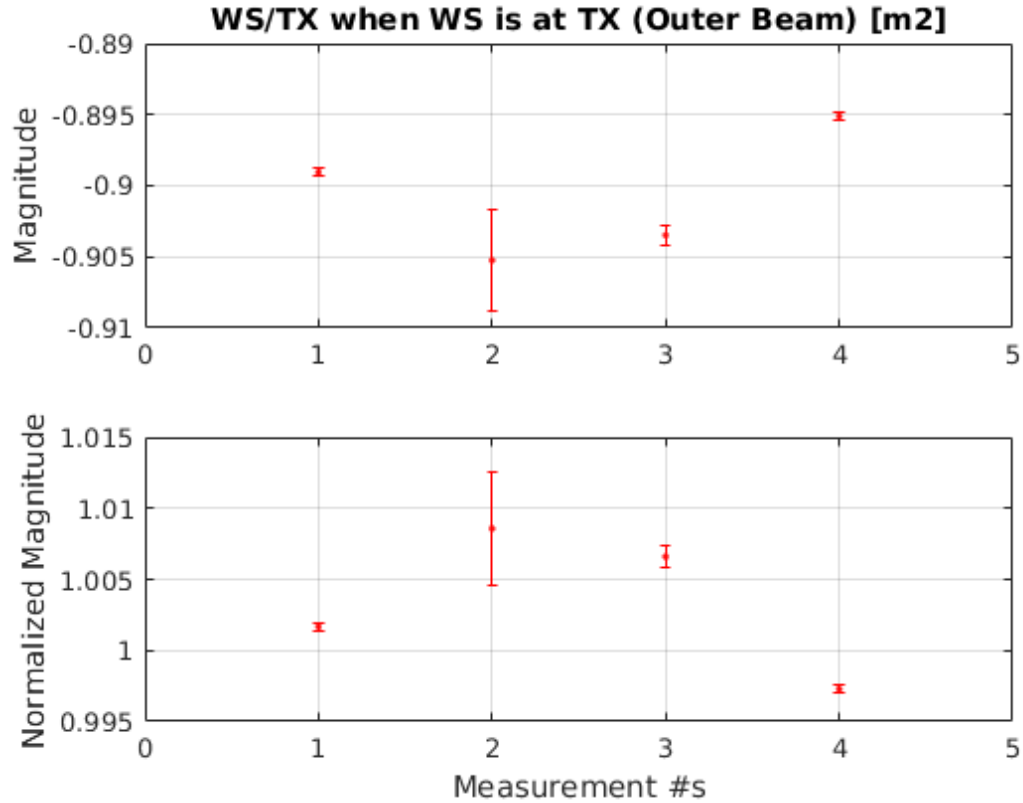
Summary of WS/TX when WS is at TX (Inner beam) [m1]:

Mean value: -0.891775
Standard deviation: 0.002010
Standard Error: 0.001148
Relative Standard Error: 0.001287

WS/TX Ratio when WS is at TX (Outer Beam)

List of Measurements

<i>Date</i>	<i>m2 ± SE_{m2}</i>	<i>Normalized</i>
D20190122	-0.899052 ± 0.000248	(1 ± 0.000275)
D20190305	-0.905249 ± 0.003566	(1 ± 0.003940)
D20190312	-0.903477 ± 0.000682	(1 ± 0.000755)
D20190423	-0.895117 ± 0.000254	(1 ± 0.000284)



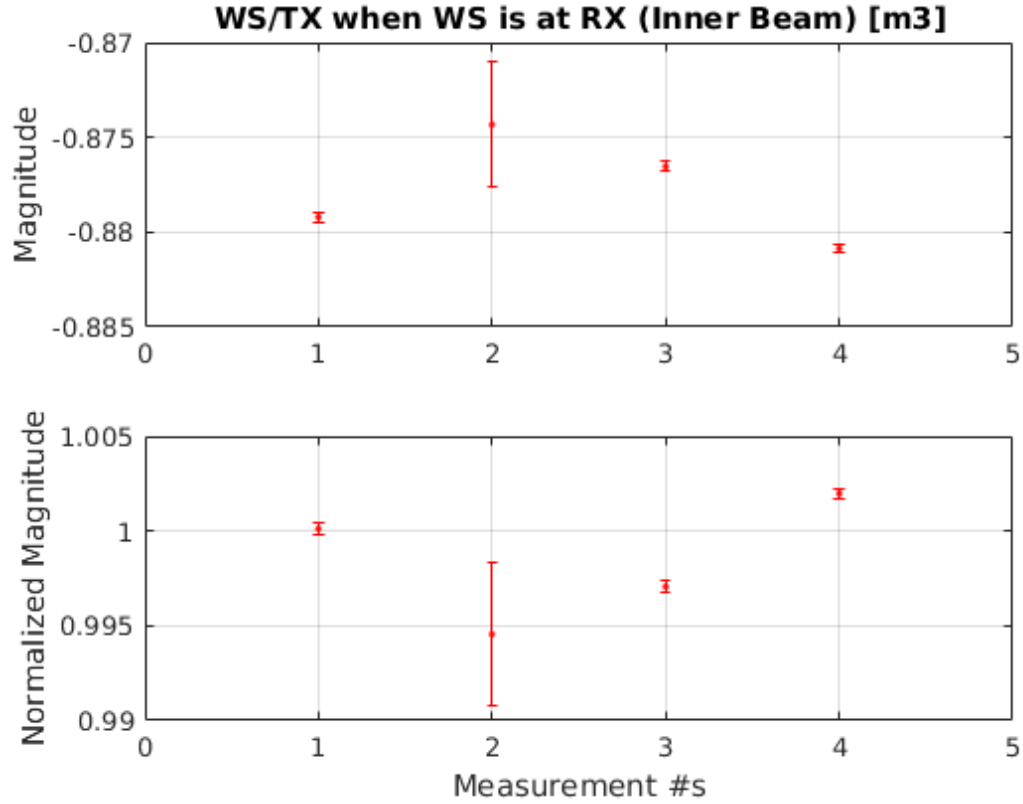
Summary of WS/TX when WS is at TX (Outer Beam) [m2]:
Mean value: -0.897557
Standard deviation: 0.002860
Standard Error: 0.001632
Relative Standard Error: 0.001819

WS/TX Ratio when WS is at RX (Inner Beam)

List of Measurements

<i>Date</i>	<i>m3 ± SE_{m3}</i>	<i>Normalized</i>
D20190122	-0.879214 ± 0.000247	(1 ± 0.000281)

D20190305	-0.874329 ± 0.003299	(1 ± 0.003773)
D20190312	-0.876532 ± 0.000269	(1 ± 0.000307)
D20190423	-0.880851 ± 0.000224	(1 ± 0.000255)



Summary of WS/TX when WS is at RX (Inner Beam) [m3]:
Mean value: -0.879114
Standard deviation: 0.002027
Standard Error: 0.001157
Relative Standard Error: 0.001316

WS/TX Ratio when WS is at RX (Outer Beam)

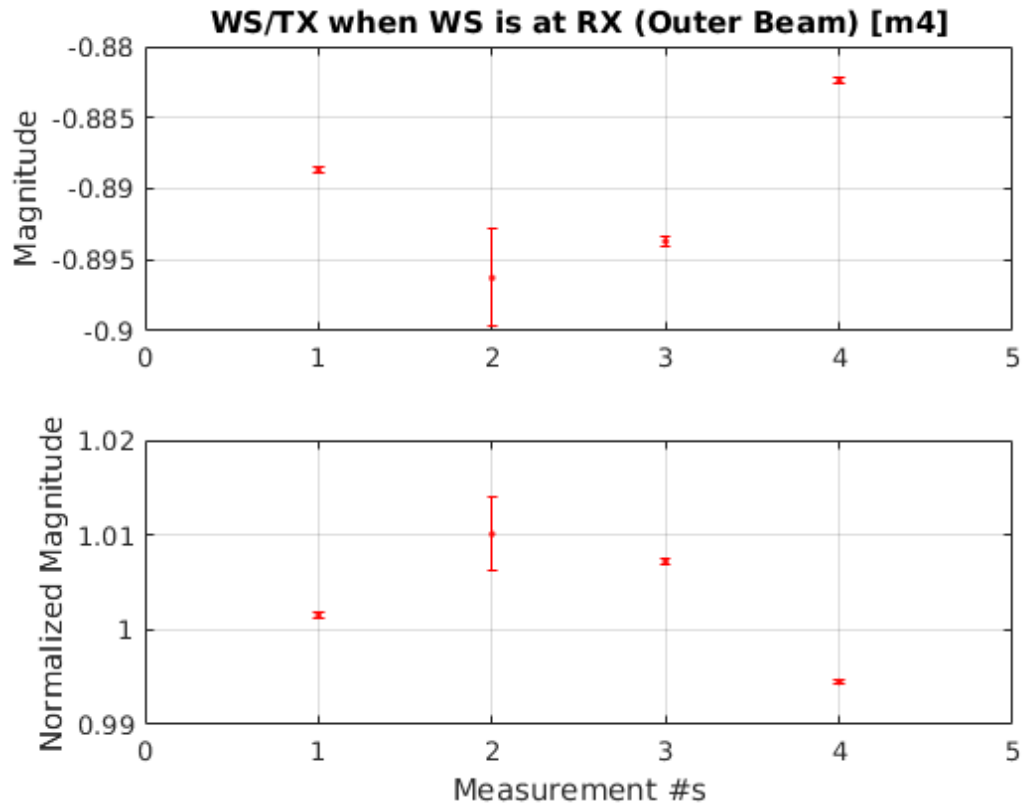
List of Measurements

Date	$m4 \pm SE_{\{m4\}}$	Normalized
D20190122	-0.888682 ± 0.000240	(1 ± 0.000270)
D20190305	-0.896273 ± 0.003441	(1 ± 0.003839)
D20190312	-0.893703 ± 0.000294	(1 ± 0.000329)

D20190423

-0.882418 ± 0.000223

(1 ± 0.000252)



Summary of WS/TX when WS is at RX (Outer Beam) [m4]:

Mean value: -0.887313

Standard deviation: 0.005194

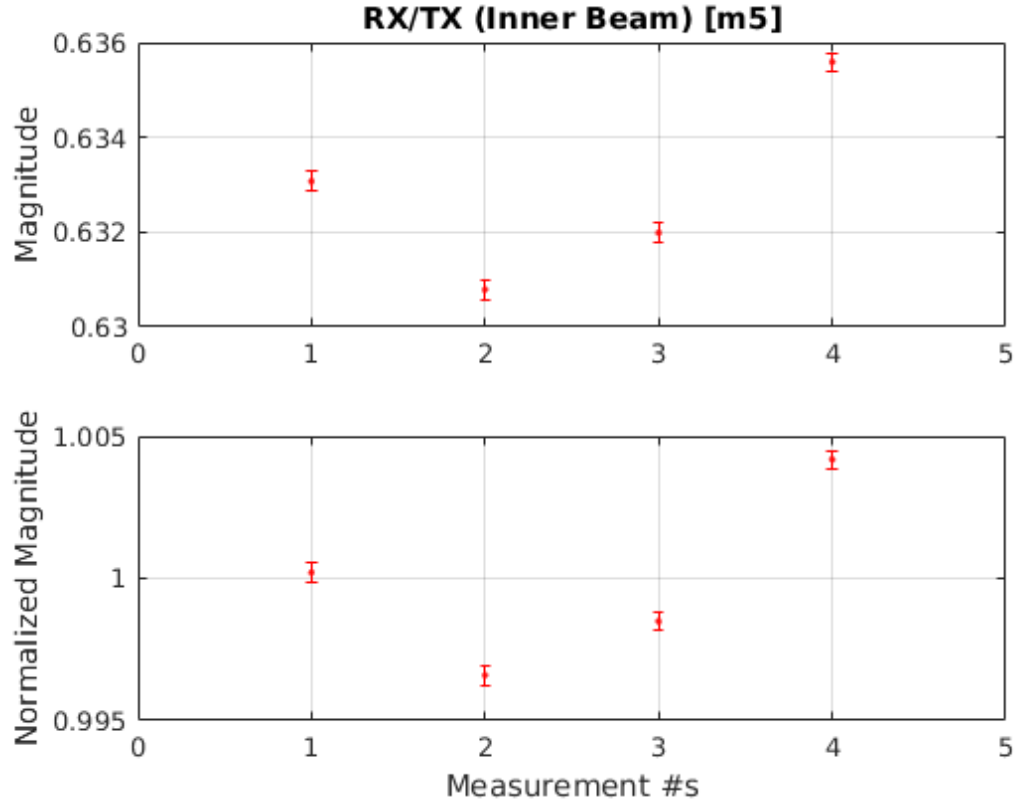
Standard Error: 0.002965

Relative Standard Error: 0.003341

RX/TX Ratio (Inner Beam)

List of Measurements

Date	$m5 \pm SE_{\{m5\}}$	Normalized
D20190122	0.633071 ± 0.000216	(1 ± 0.000341)
D20190305	0.630788 ± 0.000218	(1 ± 0.000345)
D20190312	0.631987 ± 0.000202	(1 ± 0.000320)
D20190423	0.635590 ± 0.000200	(1 ± 0.000315)



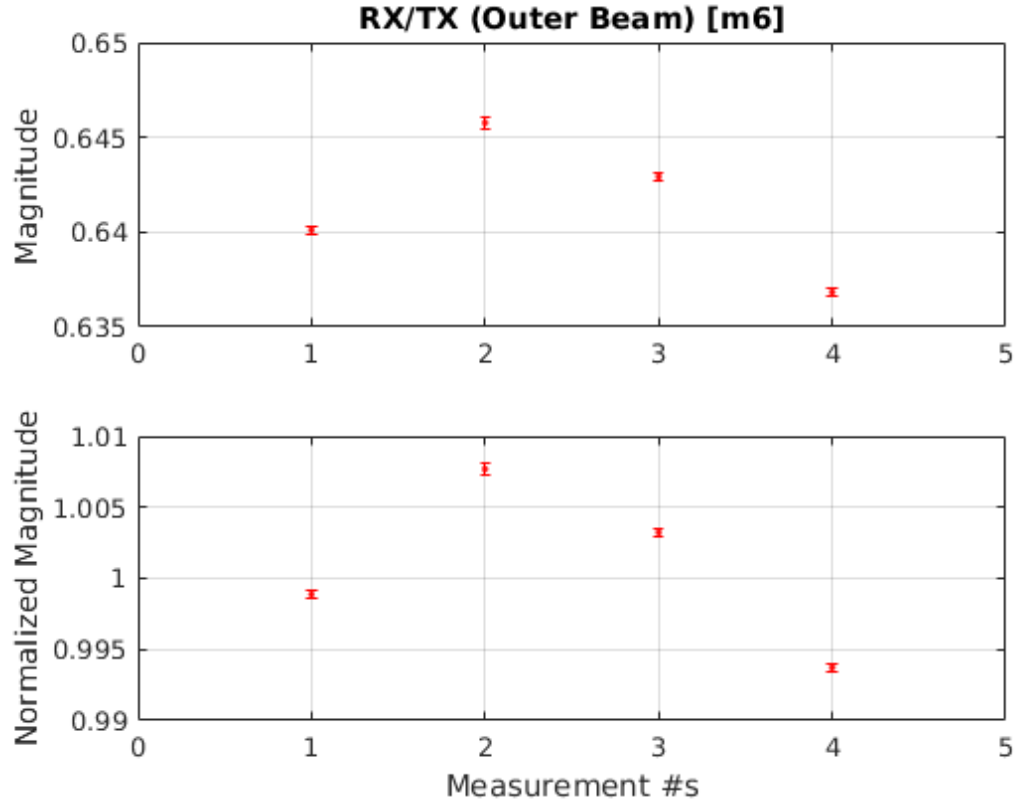
Summary of RX/TX (Inner Beam) [m5]:

Mean value:	0.632943
Standard deviation:	0.002070
Standard Error:	0.001181
Relative Standard Error:	0.001867

RX/TX Ratio (Outer Beam)

List of Measurements

Date	$m6 \pm SE_{\{m6\}}$	Normalized
D20190122	0.640122 ± 0.000203	(1 ± 0.000317)
D20190305	0.645771 ± 0.000294	(1 ± 0.000455)
D20190312	0.642919 ± 0.000187	(1 ± 0.000291)
D20190423	0.636828 ± 0.000201	(1 ± 0.000316)



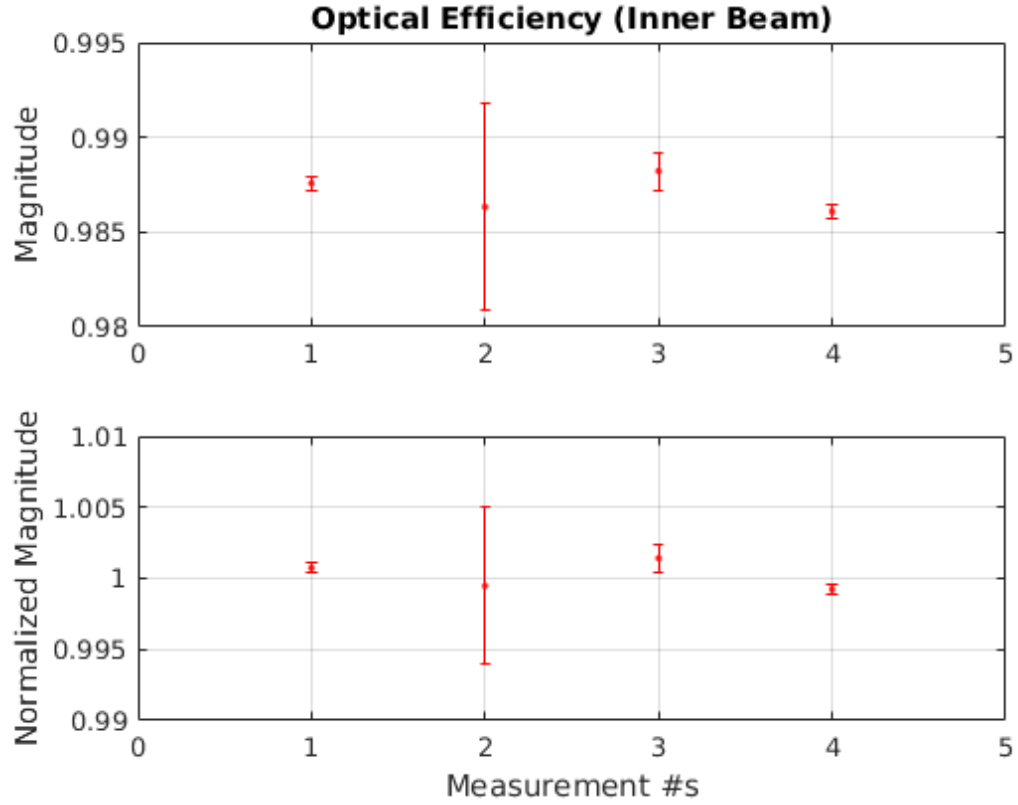
Summary of RX/TX (Outer Beam) [m6]:

Mean value:	0.640843
Standard deviation:	0.003492
Standard Error:	0.001993
Relative Standard Error:	0.003110

Optical Efficiency of Inner Beam

List of Measurements

Date	$e_i \pm SE_{\{e_i\}}$	Normalized
D20190122	0.987579 ± 0.000391	(1 ± 0.000396)
D20190305	0.986323 ± 0.005475	(1 ± 0.005551)
D20190312	0.988231 ± 0.000999	(1 ± 0.001011)
D20190423	0.986089 ± 0.000349	(1 ± 0.000354)



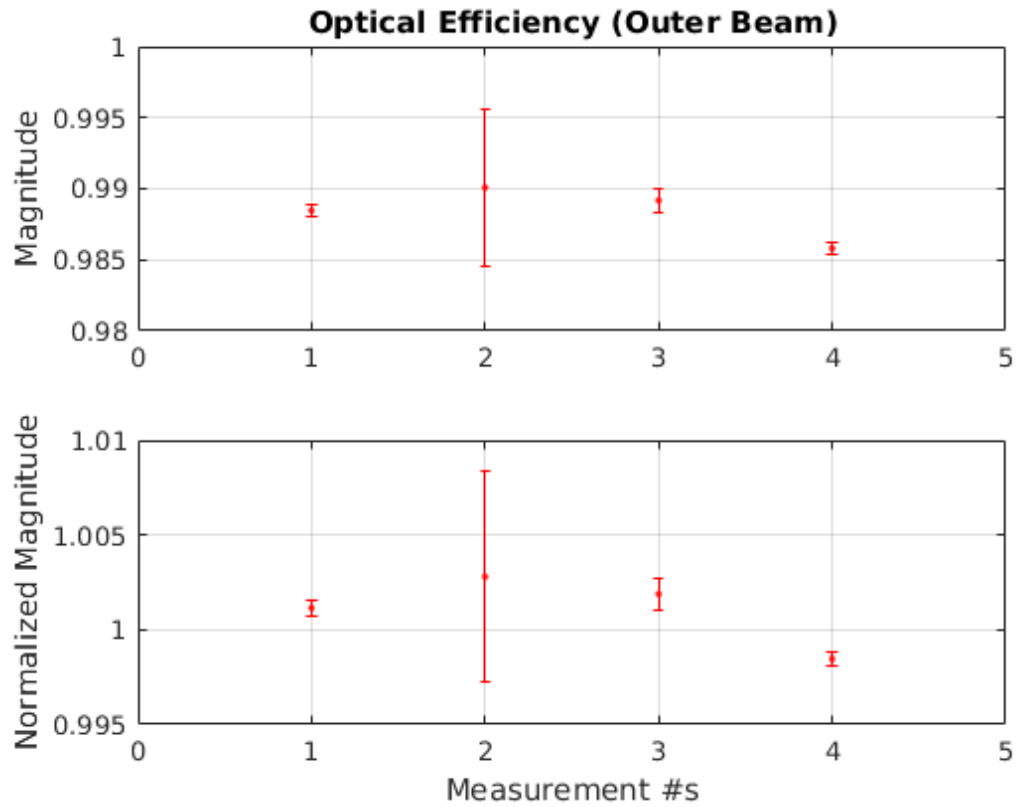
Summary of Optical Efficiency (Inner Beam):

Mean value: 0.986843
Standard deviation: 0.000926
Standard Error: 0.000529
Relative Standard Error: 0.000536

Optical Efficiency of Outer Beam

List of Measurements

Date	$e_o \pm SE_{\{e_o\}}$	Normalized
D20190122	0.988466 ± 0.000386	(1 ± 0.000390)
D20190305	0.990085 ± 0.005501	(1 ± 0.005556)
D20190312	0.989182 ± 0.000823	(1 ± 0.000832)
D20190423	0.985814 ± 0.000380	(1 ± 0.000386)



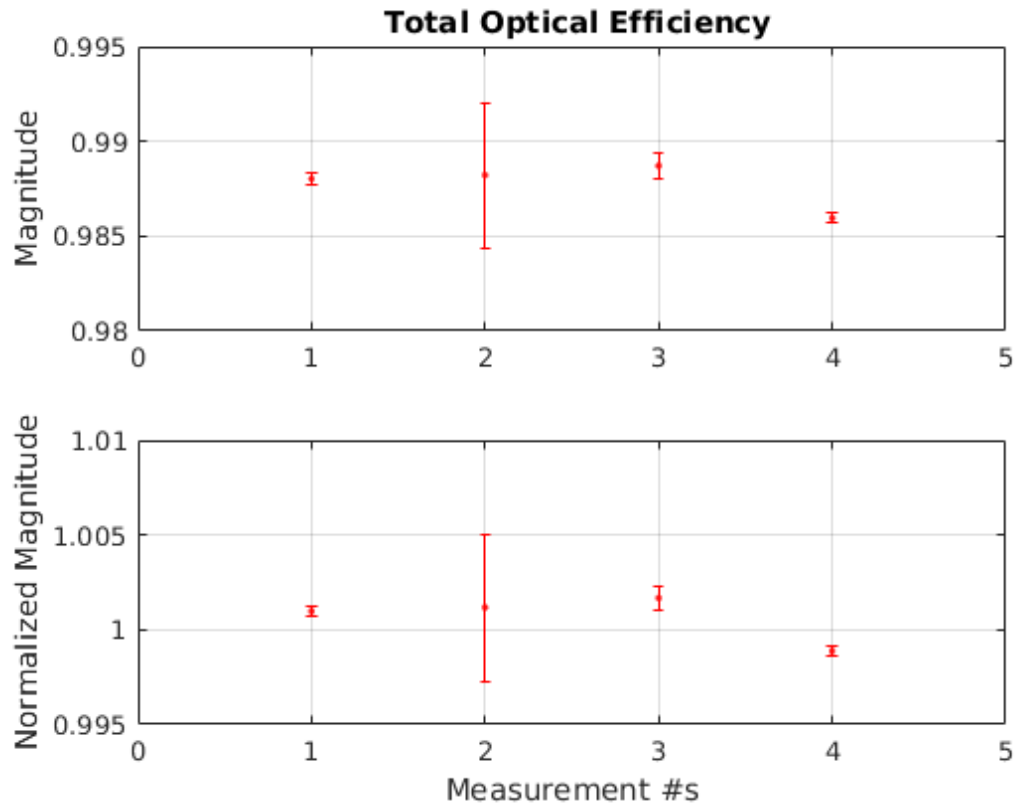
Summary of Optical Efficiency (Outer Beam):

Mean value: 0.987328
 Standard deviation: 0.001622
 Standard Error: 0.000926
 Relative Standard Error: 0.000938

Total Optical Efficiency

List of Measurements

<i>Date</i>	<i>e ± SE_{e}</i>	<i>Normalized</i>
D20190122	0.988025 ± 0.000271	(1 ± 0.000275)
D20190305	0.988224 ± 0.003835	(1 ± 0.003881)
D20190312	0.988711 ± 0.000639	(1 ± 0.000646)
D20190423	0.985951 ± 0.000255	(1 ± 0.000258)



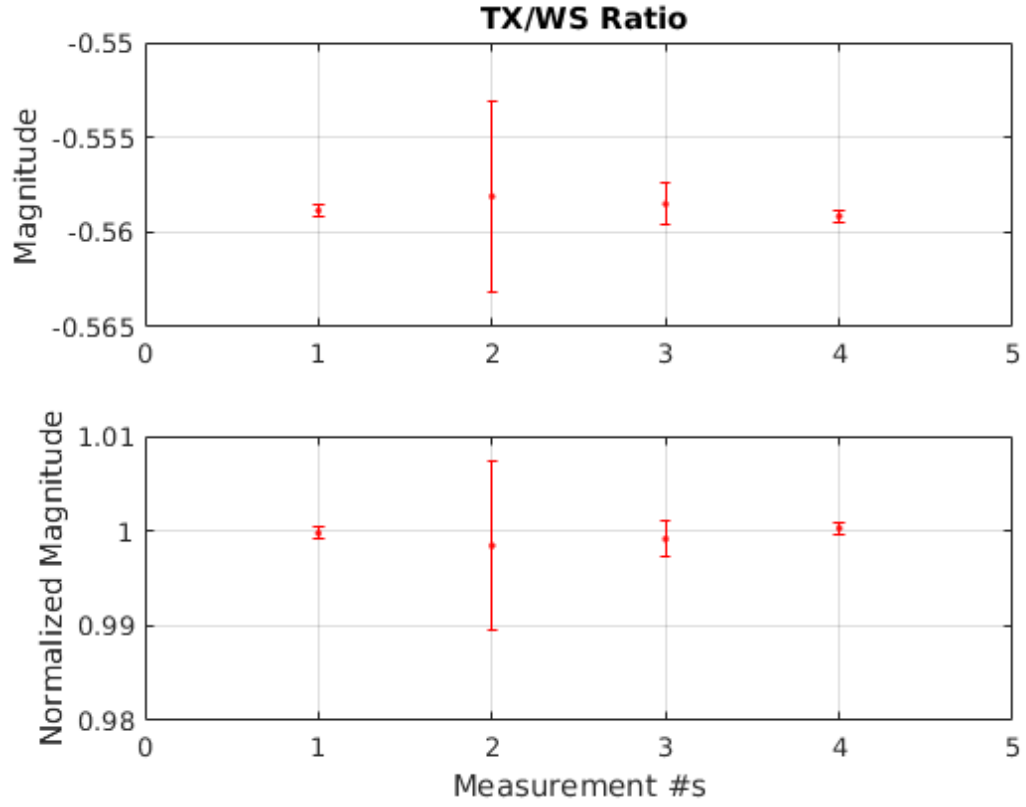
Summary of Total Optical Efficiency:

Mean value: 0.987063
 Standard deviation: 0.001274
 Standard Error: 0.000727
 Relative Standard Error: 0.000737

TX/WS Ratio

List of Measurements

<i>Date</i>	<i>R_TW ± SE_{R_TW}</i>	<i>Normalized</i>
D20190122	-0.558870 ± 0.000346	(1 ± 0.000619)
D20190305	-0.558129 ± 0.005009	(1 ± 0.008974)
D20190312	-0.558519 ± 0.001085	(1 ± 0.001942)
D20190423	-0.559161 ± 0.000332	(1 ± 0.000594)



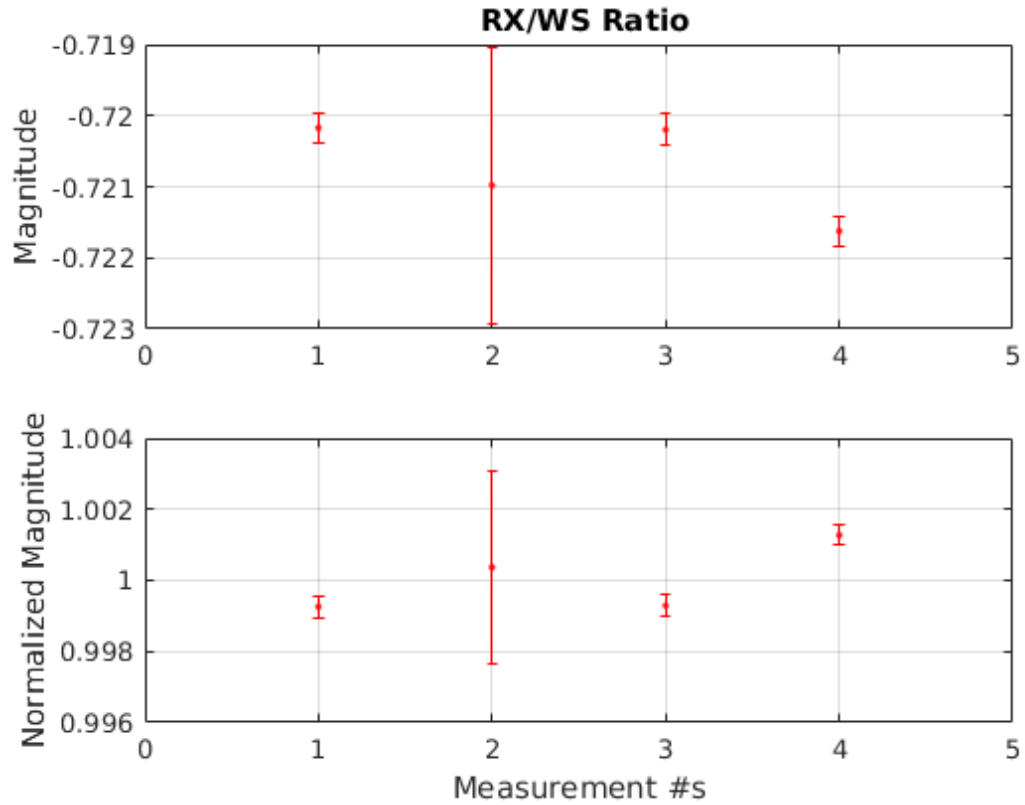
Summary of TX/WS Ratio:

Mean value:	-0.558996
Standard deviation:	0.000209
Standard Error:	0.000119
Relative Standard Error:	0.000214

RX/WS Ratio

List of Measurements

Date	$R_{RW} \pm SE_{\{R_{RW}\}}$	Normalized
D20190122	-0.720173 ± 0.000219	(1 ± 0.000304)
D20190305	-0.720980 ± 0.001951	(1 ± 0.002706)
D20190312	-0.720198 ± 0.000224	(1 ± 0.000312)
D20190423	-0.721624 ± 0.000206	(1 ± 0.000286)



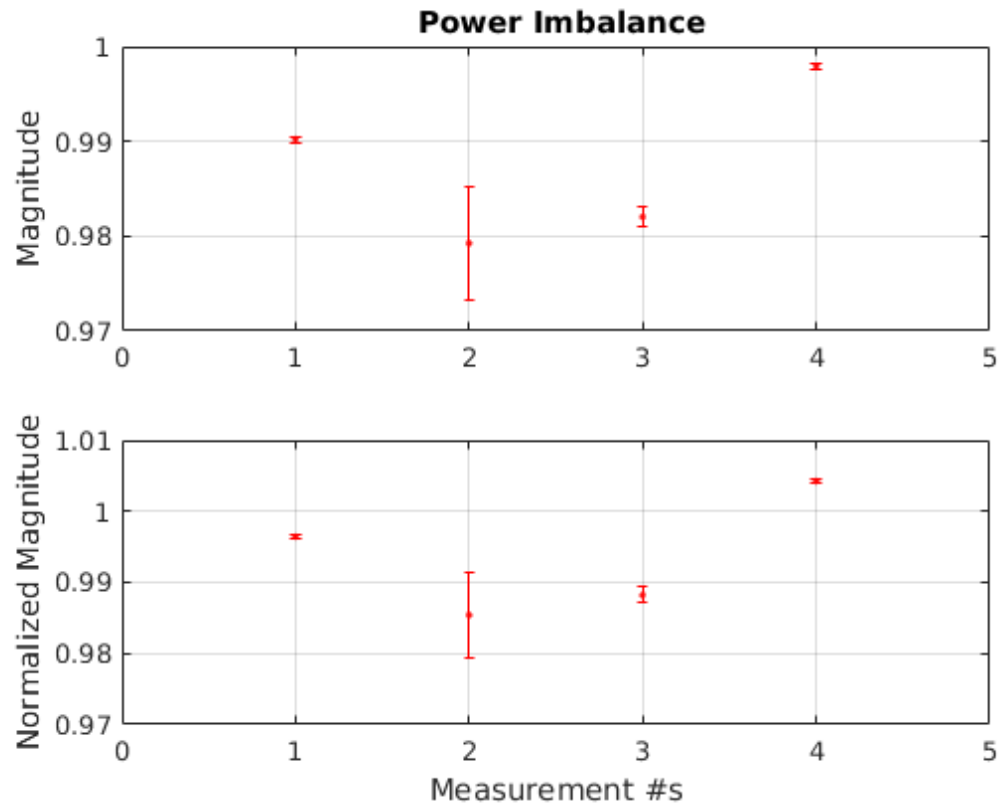
Summary of RX/WS Ratio:

Mean value:	-0.720712
Standard deviation:	0.000799
Standard Error:	0.000456
Relative Standard Error:	0.000633

Power Imbalance

List of Measurements

D20190122	0.990220 ± 0.000309	(1 ± 0.000312)
D20190305	0.979253 ± 0.005911	(1 ± 0.006036)
D20190312	0.982046 ± 0.001100	(1 ± 0.001120)
D20190423	0.997965 ± 0.000299	(1 ± 0.000299)



Summary of Power Imbalance:

Mean value:	0.993759
Standard deviation:	0.005154
Standard Error:	0.002942
Relative Standard Error:	0.002961

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