L1 TMSY
Telescope focal tuning results

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LIGO-G1400170

Source Parameters (MM results)

1. IR beam retro reflected using flipper mirror on periscope. The RED marked values are used for the model.

[EXTERNAL RESULTS]

	Min	Max	Mean	Std Dev	Dim
M≤x	0.96	0.97	0.96	0.004	-
M≤y	1.18	1.20	1.19	0.006	-
M≤r	1.09	1.10	1.10	0.003	-
2Wox	1.605	1.667	**1.632**	**0.0264**	mm
2Woy	2.164	2.226	**2.192**	**0.0245**	mm
2Wor	1.906	1.966	1.932	0.0250	mm
2Wex	4.142	4.167	4.152	0.0095	mm
2Wey	4.095	4.139	4.122	0.0165	mm
2Wer	4.121	4.153	4.137	0.0113	mm
Zox	-4.737	-4.833	**-4.776**	**-0.0401**	m
Zoy	-4.680	-4.795	**-4.737**	**-0.0468**	m
Zor	-4.711	-4.796	-4.758	-0.0403	m
Zrx	1.988	2.121	2.041	0.0587	mm
Zry	2.895	3.078	2.974	0.0784	mm
Zrr	2.449	2.604	2.514	0.0670	mm
Divergencex	0.79	0.81	0.80	0.010	mr
Divergencey	0.72	0.75	0.74	0.011	mr
Divergencer	0.76	0.78	0.77	0.011	mr

Astigmatism(Zoy-Zox)/Zrr	-0.0	3.1	1.5	1.25	%
Waist Asymmetry(2Woy/2Wox)		1.335	1.351	1.343	0.0073
Divergence Asymmetry Thetay/Thetax			0.919	0.926	0.922	0.0035

Tele Measurement - 1 (Single Lens)

1. IR beam into the Tele, retro-reflected by the 8” flat ETM, back to the MM.
2. The RED marked values are used in the model are return values.

[EXTERNAL RESULTS]

	Min	Max	Mean	Std Dev	Dim
M≤x	0.91	1.11	0.98	0.082	-
M≤y	0.98	1.06	1.02	0.032	-
M≤r	1.08	1.19	1.13	0.042	-
2Wox	0.788	0.957	**0.836**	**0.0711**	mm
2Woy	0.841	0.871	**0.861**	**0.0120**	mm
2Wor	0.909	1.015	0.965	0.0387	mm
2Wex	1.305	1.569	1.459	0.1102	mm
2Wey	2.225	2.373	2.295	0.0665	mm
2Wer	1.877	1.992	1.925	0.0442	mm
Zox	-0.666	-0.802	**-0.754**	**-0.0560**	m
Zoy	-1.304	-1.350	**-1.327**	**-0.0188**	m
Zor	-1.006	-1.078	-1.045	-0.0264	m
Zrx	0.482	0.610	0.529	0.0486	mm
Zry	0.530	0.551	0.537	0.0083	mm
Zrr	0.566	0.639	0.606	0.0265	mm
Divergencex	1.54	1.63	1.58	0.039	mr
Divergencey	1.56	1.64	1.60	0.033	mr
Divergencer	1.59	1.61	1.59	0.008	mr

Astigmatism(Zoy-Zox)/Zrr	-106.7	-87.2	-94.5	8.54	%
Waist Asymmetry(2Woy/2Wox)		0.907	1.098	1.035	0.0768
Divergence Asymmetry Thetay/Thetax			0.967	1.069	1.014 0.0444

Tele Measurement – 2 (Single Lens)

1. Same as 'Tele Measurement – 1', but with the ModeMaster rotated (roll) by 45 degrees, to sample the beam differently.
2. The RED marked values are used as the return values.

[EXTERNAL RESULTS]

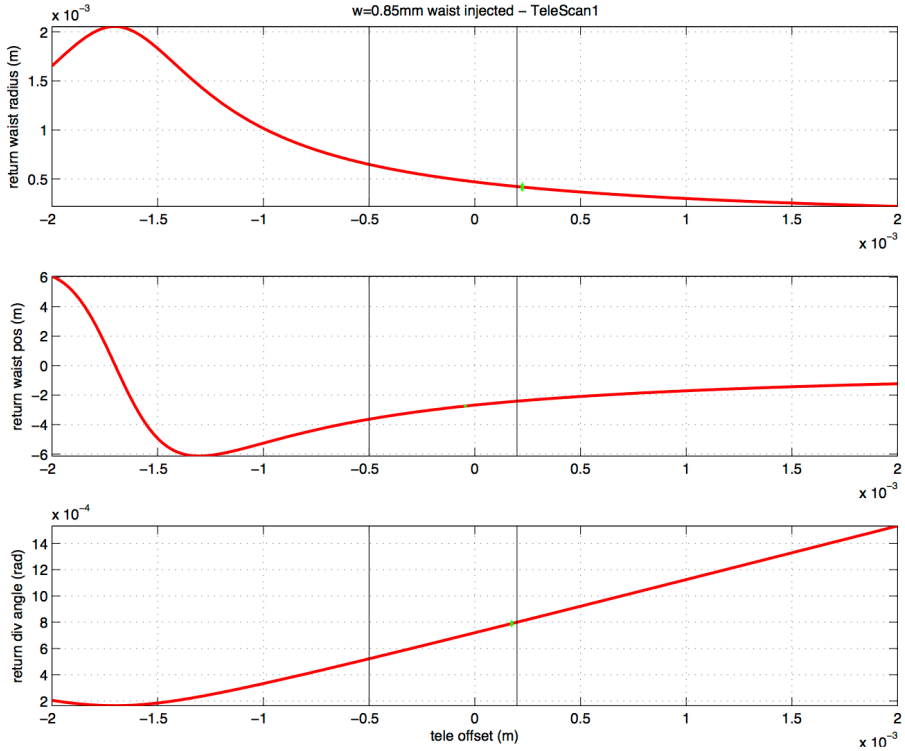
	Min	Max	Mean	Std Dev	Dim
M≤x	1.05	1.14	1.11	0.036	-
M≤y	1.10	1.17	1.12	0.031	-
M≤r	1.09	1.17	1.14	0.033	-
2Wox	0.975	1.045	**1.019**	**0.0264**	mm
2Woy	0.848	0.892	**0.864**	**0.0170**	mm
2Wor	0.924	0.966	0.950	0.0168	mm
2Wex	1.762	1.974	1.861	0.0842	mm
2Wey	1.908	2.245	2.046	0.1309	mm
2Wer	1.912	2.055	1.958	0.0580	mm
Zox	-0.995	-1.141	**-1.052**	**-0.0628**	m
Zoy	-0.976	-1.158	**-1.053**	**-0.0775**	m
Zor	-1.028	-1.103	-1.052	-0.0312	m
Zrx	0.668	0.712	0.688	0.0162	mm
Zry	0.475	0.502	0.491	0.0118	mm
Zrr	0.577	0.587	0.584	0.0048	mm
Divergencex	1.46	1.50	1.48	0.016	mr
Divergencey	1.73	1.80	1.76	0.030	mr
Divergencer	1.60	1.64	1.63	0.019	mr

Astigmatism(Zoy-Zox)/Zrr	-22.7	28.1	-0.3	22.43	%
Waist Asymmetry(2Woy/2Wox)		0.818	0.886	0.848	0.0303
Divergence Asymmetry Thetay/Thetax			1.169	1.228	1.189	0.0226

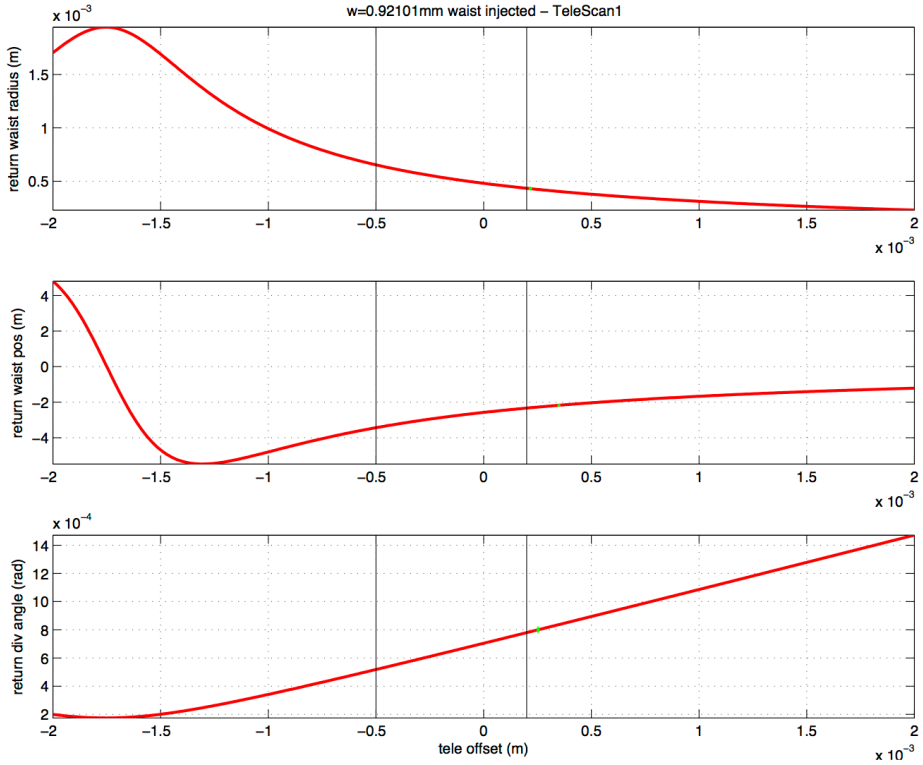
Telescope de-tuning Results (using TeleScan1 measurements)

1. Input into the TeleModel are the measured Source Parameters from the ModeMaster.
2. The GREEN markers are from the measured ModeMaster results from ‘Tele Measurement 1’ (they should be crossing the red calculated line).
3. The vertical lines indicate the tolerance.

X-axis



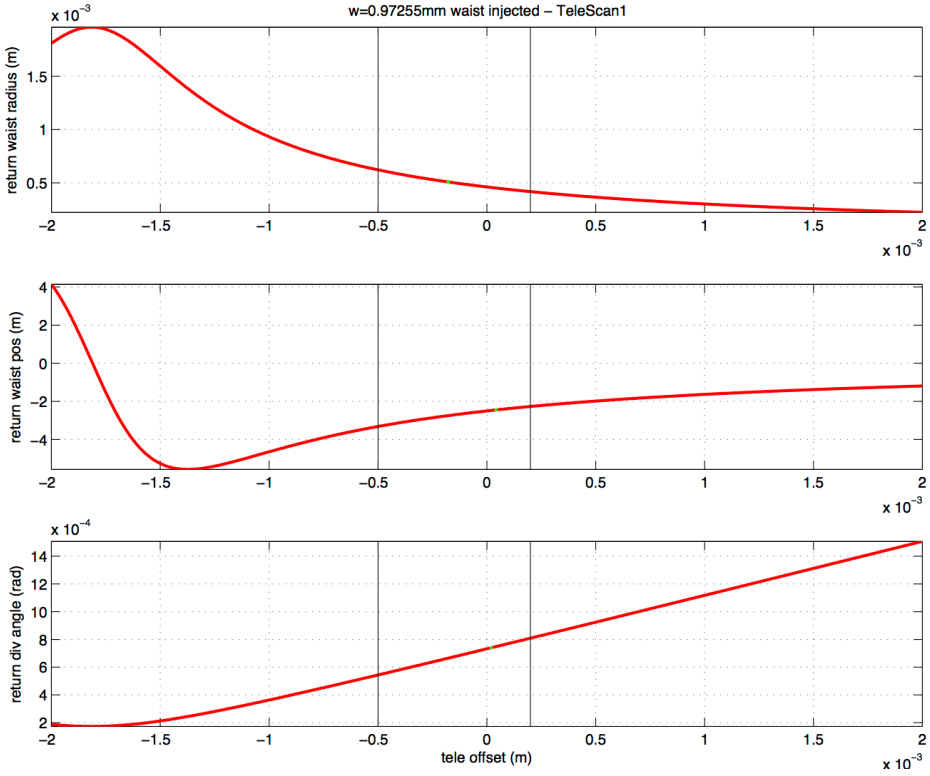
Y-axis



Telescope de-tuning Results (using TeleScan2 measurements)

1. Input into the TeleModel are the measured Source Parameters from the ModeMaster.
2. The GREEN markers are from the measured ModeMaster results from ‘Tele Measurement 2’ (they should be crossing the red calculated line).
3. The vertical lines indicate the tolerance.

X-axis



Y-axis