H1 TMSX Telescope focal tuning results

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LIGO-G1400514

Relevant documents

Change from H1 TMSY (pilot) that is applicable to all other units including H1 TMSX

- Changed a vendor of some of flat optics for coating quality.
- Different spec for the primary optic thickness (thinner than pilot unit) though the vendor is the same.
  - Spec for the curved surface didn't change.
- No change in the tuning target parameter nor procedure.

Source Parameters (MM results)

1. IR beam from the source was measured using Mode Master (MM). MM to the last lens of launcher telescope is 75.8cm.
2. Relevant part of the measurement file (0725_src_doublet.std) is shown below. The RED marked values are used for the model.

[EXTERNAL RESULTS]

	Min	Max	Mean	Std Dev	Dim
M≤x	1.09	1.11	1.10	0.007	-
M≤y	1.12	1.14	1.13	0.006	-
M≤r	1.11	1.12	1.11	0.005	-
2Wox	4.212	4.673	4.480	0.1526	mm
2Woy	4.061	4.505	4.325	0.1544	mm
2Wor	4.137	4.590	4.403	0.1531	mm
2Wex	5.726	5.786	5.744	0.0190	mm
2Wey	5.748	5.806	5.784	0.0217	mm
2Wer	5.742	5.790	5.764	0.0167	mm
Zox	10.998	10.427	10.774	-0.1935	m
Zoy	11.011	10.636	10.839	-0.1257	m
Zor	11.005	10.538	10.808	-0.1500	m
Zrx	11.860	14.720	13.488	0.9208	mm
Zry	10.755	13.362	12.260	0.8669	mm
Zrr	11.287	14.017	12.851	0.8917	mm
Divergencex		0.32	0.36	0.33	0.012 mr
Divergencey		0.34	0.38	0.35	0.013 mr
Divergencer		0.33	0.37	0.34	0.012 mr
Astigmatism(Zoy-Zox)/Zrr			-0.4	2.3	0.5 0.86 %
Waist Asymmetry(2Woy/2Wox)				0.958	0.976 0.965 0.0053
Divergence Asymmetry Thetay/Thetax				1.051	1.071 1.062 0.0061

Tele Measurement

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

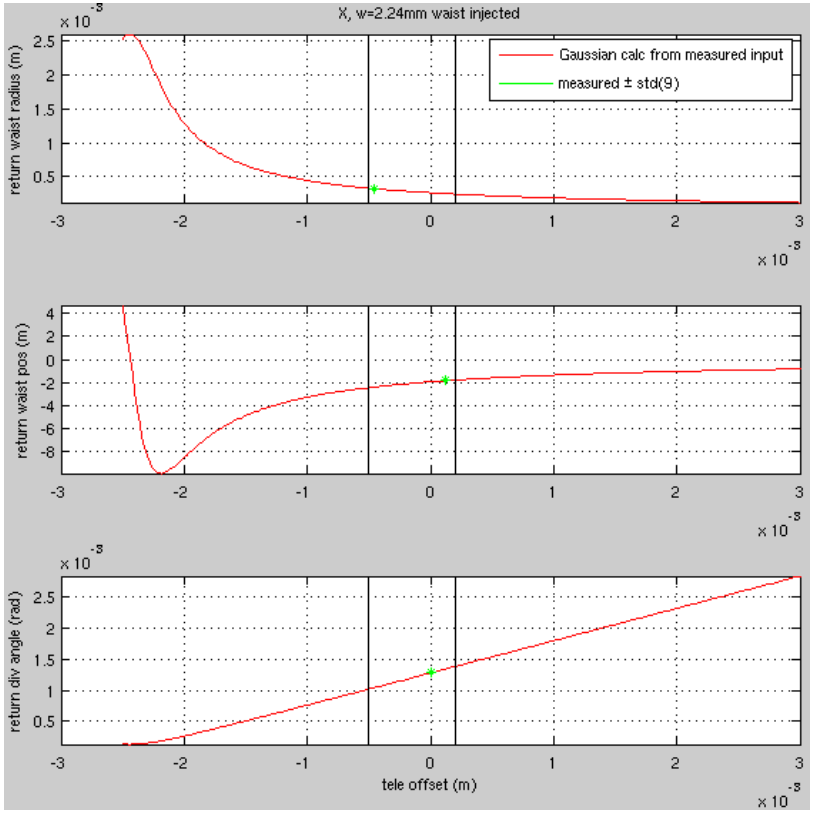
[EXTERNAL RESULTS]

	Min	Max	Mean	Std Dev	Dim
M2x	1.17	1.28	1.23	0.037	-
M2y	1.03	1.16	1.07	0.040	-
M2r	1.32	1.42	1.36	0.033	-
2Wox	0.637	0.671	0.652	0.0128	mm
2Woy	0.630	0.679	0.655	0.0140	mm
2Wor	0.742	0.797	0.768	0.0171	mm
2Wex	2.209	2.387	2.285	0.0580	mm
2Wey	1.263	1.469	1.320	0.0594	mm
2Wer	1.817	1.929	1.867	0.0378	mm
Zox	-0.827	-0.890	-0.856	-0.0209	m
Zoy	-0.494	-0.562	-0.515	-0.0208	m
Zor	-0.687	-0.741	-0.709	-0.0178	m
Zrx	0.245	0.261	0.255	0.0059	mm
Zry	0.276	0.312	0.295	0.0113	mm
Zrr	0.307	0.332	0.320	0.0081	mm
Divergencex		2.48	2.63	2.56	0.046 mr
Divergencey		2.12	2.35	2.22	0.069 mr
Divergencer		2.36	2.45	2.40	0.026 mr
Astigmatism(Zoy-Zox)/Zrr		99.1	112.9	106.3	4.46 %
Waist Asymmetry(2Woy/2Wox)			0.960	1.062	1.005 0.0322
Divergence Asymmetry Thetay/Thetax				0.813	0.945 0.869 0.0388

Telescope de-tuning Results

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 3’ (they should be crossing the red calculated line).
3. The vertical lines indicate the tolerance.

X-axis



Y-axis