
IAS Theodolite/Autocolimator Positions

This notebook verifies the positions and orientations of the IAS theodolite/autocolimator for initial alignment and positioning of the core optics. It also calculates the pitch angles of the COC relative to the local horizontal.

■ Version History

Intialization

Global to Local Coordinate Transformation Matrices

Optic surface positions & orientations

Suspension Pitch Angles

■ 2km Interferometer @ Hanford

	U1	V1	W1	Pitch	(rad)	(deg)	(min)	(sec)
RM HR (p3)	-1.	-0.000137	-0.0183	down	0.0183	1.	2.	51.
OFy	-0.924	-0.383	0.		-4.35×10^{-12}	0	0	0
FMy (p6)	0.707	0.707	0.00289	up	-0.00289	0	-9.	-57.
ITMy HR (p8)	7.73×10^{-9}	1.	0.0000125	up	-0.0000125	0	0	-3.
OFbs	-1.	0.	-0.00628	down	0.00628	0	21.	36.
BS bs (p4)	0.707	-0.707	0.00645	up	-0.00645	0	-22.	-11.
OFx	-0.00049	-1.	-0.00331	down	0.00331	0	11.	22.
FMx (p9)	0.707	0.707	0.00288	up	-0.00288	0	-9.	-53.
ITMx HR (p11)	1.	0.	-0.000619	down	0.000619	0	2.	8.
ETMx HR	-1.	0.	0.000306	up	-0.000306	0	-1.	-3.
ETMy HR	-2.02×10^{-7}	-1.	-0.000326	down	0.000326	0	1.	7.

■ 4km Interferometer @ Hanford

	U1	V1	W1	Pitch	(rad)	(deg)	(min)	(sec)
RM HR (-p3)	1.	0.000137	-0.0195	down	0.0195	1.	7.	6.
BS bs (p4)	0.707	-0.707	-0.00733	down	0.00733	0	25.	12.
ITMx HR (p7)	1.	0.	-0.000619	down	0.000619	0	2.	8.
ITMy HR (p9)	7.73×10^{-9}	1.	0.0000125	up	-0.0000125	0	0	-3.
ETMx HR	-1.	0.	-7.84×10^{-6}	down	7.84×10^{-6}	0	0	2.
ETMy HR	-3.97×10^{-7}	-1.	-0.000639	down	0.000639	0	2.	12.

■ 4km Interferometer @ Livingston

	U1	V1	W1	Pitch	(rad)	(deg)	(min)	(sec)
RM HR (-p3)	1.	0.000125	-0.0192	down	0.0192	1.	6.	3.
BS bs (p4)	0.707	-0.707	-0.00667	down	0.00667	0	22.	56.
ITMx HR (p7)	1.	0.	-0.000312	down	0.000312	0	1.	4.
ITMy HR (p9)	-1.91×10^{-7}	1.	-0.000611	down	0.000611	0	2.	6.
ETMx HR	-1.	0.	-0.000315	down	0.000315	0	1.	5.
ETMy HR	-5.85×10^{-9}	-1.	-0.0000188	down	0.0000188	0	0	4.

Theodolite/Autocolimator Alignment