

# CORE OPTICS TILT ANGLES

E000028-B-D

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**Table 1: Revision History**

REV	DATE	AUTHOR	CHECKED	DATE	DCN/DESCRIPTION
A	1-19-00	D. Coyne			E000032/INITIAL RELEASE
B	6-22-00	J. Romie			E000330/CHANGE LLO, 4K BS SURFACE NORMAL & PITCH

# 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.

## Global to Local Coordinate Transformation Matrices

### Optic surface positions & orientations

### Suspension Pitch Angles

## 2km Intererometer at Hanford

Table 2: LHO 2k

OPTIC	U1	V1	W1	Pitch	radians	deg	min.	sec
RM HR (p3)	-1	-.000137	-.0183	down	.0183	1	2	51
OFy	-.924	-.383	0		-4.35e-12	0	0	0
FMy (p6)	.707	.707	.00289	up	-.00289	0	-9	-57
ITMy HR (p8)	7.73e-9	1	1.25e-5	up	-.0000125	0	0	-3
OFbs	-1	0	-.00628	down	.00628	0	21	36
BS bs (p4)	.707	-.707	.00645	up	-.00645	0	-22	-11
OFx	-.00049	-1	-.00331	down	.00331	0	11	22
FMx (p9)	.707	.707	.00288	up	-.00288	0	-9	-53
ITMx HR (p11)	1	0	-.000619	down	.000619	0	2	8
ETMx HR	-1	0	.000306	up	-.000306	0	-1	-3
ETMy HR	-2.02e-7	-1	-.000326	down	.000326	0	1	7

## 4km Interferometer at Hanford

**Table 3: LHO 4k**

OPTIC	U1	V1	W1	Pitch	radians	deg	min	sec
RM HR ( p3 )	1	.000137	-.0195	down	.0195	1	7	6
BS (p4)	-.707	.707	.00733	up	.00733	0	25	12
ITMx HR (p7)	1	0	-.000619	down	.000619	0	2	8
ITMy HR (p9)	7.73e-9	1	.0000125	up	-.0000125	0	0	-3
ETMx HR	-1	0	-7.84e-6	down	7.84e-6	0	0	2
ETMy HR	-3.97e-7	-1	-.000639	down	.000639	0	2	12

## 4km Interferometer at Livingston

**Table 4: LLO 4k**

OPTIC	U1	V1	W1	Pitch	radians	deg	min	sec
RM HR (-p3)	1	.000125	-.0192	down	.0192	1	6	3
BS (p4)	-.707	.707	.00667	up	.00667	0	22	56
ITMx HR (p7)	1	0	-.000312	down	.000312	0	1	4
ITMy HR (p9)	-1.91e-7	1	-.000611	down	.000611	0	2	6
ETMx HR	-1	0	-.000315	down	.000315	0	1	5
ETMy HR	-5.85e-9	-1	-.0000188	down	.0000188	0	0	4