

2-k IOO global coordinates

LIGO-E010035-00-Z

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Gainesville, 16 February 2001

These tables give the positions, unit normals, and the input rays for the IOO optics of the 2-k LHO interferometer. The co-ordinates are in the global coordinates system; dimensions are in mm.

In arriving at these, we've checked the mode-matching calculation, put in the wedge angles and refraction angles in the transmissive optics, and included the 0.619 mrad tilt of the global coordinate system x -axis relative to the horizontal tables. (We ignored the $20\times$ smaller y -axis tilt.)

We made the following assumptions:

SOS height	139.7
LOS height	243
$\tan(x\text{-angle})$	0.000619
MC half length	15240.0

and W HAM tables as in the 10/26/97 version of `coorloc.xls` except that the table centers are 200 mm below the global x, y plane:

	Global Coordinates		
	x	y	z
Center of WHAM7	29342.0	9220.0	-200.0
Center of WHAM8	15621.0	9220.0	-200.0
Center of WHAM9	13051.0	9220.0	-200.0

Note that the design position of the MC curved mirror (MC2) was changed in Spring 1999 in order to make the arm cavities almost completely antiresonant with the sidebands. The change was:

	Global Coordinates			Unit normal		
	x	y	z	n_x	n_y	n_z
MC2 (old)	14920.1	9433.3	-60.7	1.000000	0.000000	0.000059
MC2 (new)	14931.1	9433.3	-60.7	1.000000	0.000000	0.000059

The mirror was actually moved by 16 mm rather than 11 mm, because 15–16 mm was the distance required to obtain the correct frequency (length). This difference may be an indication of the uncertainties in HAM table center positions.

The first 3 numeric columns are the coordinates, the second 3 the unit normals:

	Global Coordinates			Unit normal		
	x	y	z	n_x	n_y	n_z
Fixed mirror	30082.7	9664.8	-59.8			
MC1 AR side	30083.1	9555.4	-59.8			
MC1	30075.8	9528.3	-59.8	-0.704887	-0.709319	-0.000041
MC2	14920.1	9433.3	-60.7	1.000000	0.000000	0.000058
MC3	30075.8	9338.3	-59.8	-0.704887	0.709319	-0.000041
MC3 AR side	30083.8	9311.9	-59.8			
SM1	30101.1	8591.2	-59.8	-0.715118	0.699003	-0.000443
Wave plate	29903.7	8591.4	-60.0			
Polarizer, 1st	29827.8	8591.6	-60.0			
Polarizer, 2nd	29807.8	8592.2	-60.0			
Faraday 1st	29665.4	8592.4	-60.1			
Faraday 2nd	29645.4	8592.4	-60.1			
Wave plate	29527.5	8592.6	-60.2			
Polarizer, 1st	29483.0	8592.6	-60.2			
Polarizer, 2nd	29463.0	8591.9	-60.2			
SM2	28472.1	8593.2	-60.8	0.977140	0.212596	0.000605
MMT1	29044.6	8855.6	-60.5	-0.980203	-0.197986	0.001640
MMT2	15796.9	9268.0	-10.7	0.999734	-0.023066	0.000084
MMT3	29510.7	9062.1	43.1	-0.999971	0.007419	-0.001962
IOO handoff	14000.0	9060.0	43.0			
RM back sfe	12278.6	9059.7	43.0			

In this table, the first numeric column is the distance the input ray has come from the previous optic; the next 3 are the components of the input ray unit vector.

	Input ray	In as UNIT		
	$ u $	u_x	u_y	u_z
MC1 AR side	109.3	0.004095	-0.999992	0.000003
MC1	15145.0	0.999980	0.006273	0.000058
MC3	190.0	0.000000	-1.000000	0.000000
MC2	15145.0	-0.999980	0.006273	-0.000058
SM1	721.0	0.024055	-0.999711	0.000015
Wave plate	197.4	-0.999999	0.001266	-0.000619
Polarizer, 1st	75.8	-0.999996	0.002784	-0.000619
Polarizer, 2nd	20.0	-0.999581	0.028944	-0.000619
Faraday 1st	142.5	-0.999999	0.001248	-0.000619
Faraday 2nd	20.0	-0.999999	0.001270	-0.000619
Wave plate	117.9	-0.999999	0.001328	-0.000619
Polarizer, 1st	44.5	-0.999999	0.000991	-0.000619
Polarizer, 2nd	20.0	-0.999434	-0.033632	-0.000619
SM2	990.9	-0.9999990	0.001266	-0.000619
MMT1	629.7	0.9090788	0.416624	0.000563
MMT2	13254.2	-0.9995087	0.031118	0.003756
MMT3	13715.4	0.9998796	-0.015012	0.003923
IOO Handoff	15510.7	-1.0000000	-0.000139	-0.000006
RM back sfe	1721.4	-1.0000000	-0.000139	0.000006

Please send comments, questions to tanner@phys.ufl.edu.