H2 Interferometer Resonances

Use these quick links to go directly to the desired H1 subsystem:

Beamsplitter, ITMs, ETMs, Folding Mirrors, Recycling Mirror, MMT3 Mirror, Small Optic Suspensions, Optical Levers, Violin Modes, Magnet Standoff Assembly, PSL Periscope **Resonance**s, HAM, BSC, LHO References

Beamsplitter (BS) Resonances (H2)

Description	f_{th}(Hz)	f_{meas}(Hz)	Q_{th}	Q_{meas}	References
PENDULAR RESONANCES					
pendular	.744	.760			3/26/-/-
sideways pendular		.737?			-/26/-/-
pitch	.600	.623			3/26/-/-
yaw	.500	.497			3/26/-/-
vertical	~12.8	12.586			-/6/-/-
roll	~18.1	18.575			10/6/-/-
violin	223				3/-/-/-
INTERNAL RESONANCES					
butterfly	3785	3733.7		1.85x10^6	1/2/-/2
butterfly	3785				1/-/-/-
drumhead	5578	5477.5		2.5x10^4	1/2/-/2
3-fold-radial	7975	7812	1.3x10^6	265000	1/2/1/2
3-fold-radial	7975	7812			1/-/-/-

	11259	11138.7		3.6x10^5	1/-/-/-
	11332				1/-/-/-
	11334				1/-/-/-
	12674				1/-/-/-
	12677				1/-/-/-
	12760				1/-/-/-
	12670				1/-/-/-
	14629				1/-/-/-
	17283				1/-/-/-
	17283				1/-/-/-
	17388				1/-/-/-
	17388				1/-/-/-
	17958				1/-/-/-
	17958				1/-/-/-

Input Test Mass (ITM) Resonances (H2)

H2 ITMx

Description	**f_{th}(Hz)**	**f_{meas}(Hz)**	**Q_{th}**	**Q_{meas}**	**References**
PENDULAR RESONANCES					
pendular	.743	.764			3/26/-/-
sideways pendular		.772			3/26/-/-
pitch	.600	.658			3/26/-/-
yaw	.497	.496			3/26/-/-
vertical	12.63	11.71			3/21/-/-

roll					-/-/-/-
violin1	341	348.941			3/29/-/-
violin2	341	349.457			3/29/-/-
INTERNAL RESONANCES					
butterfly(mode 7)		6749.188	1.3x10^6	1750000	-/24/3/24
butterfly(mode 8)		6749.719		7.74x10^5	-/24/-/24
drumhead (aliased)		6991.27 (freq. deviation of +/-1x10^-5)			-/28/-/-
drumhead(un-aliased)		9392.73	1.3x10^6	674000	-/28/3/24
mode 10		11203.500		4.6x10^6	-/24/-/24
mode 14		12546.788		7.80x10^4	-/24/-/24
mode 15		12547.828		2.03x10^5	-/24/-/24
breathing (mode 16)		14373.750		1.34x10^7	-/24/-/24
2nd drum head (mode 32)		22321.359		2.34x10^6	-/24/-/24

H2 ITMy

Description	**f_{th}(Hz)**	**f_{meas}(Hz)**	**Q_{th}**	**Q_{meas}**	**References**
PENDULAR RESONANCES					
pendular	.743	.776			3/26/-/-
sideways pendular		.743			3/26/-/-
pitch	.600	.660			3/26/-/-
yaw	.497	.499			3/26/-/-
vertical	12.63	11.72			3/21/-/-
roll					-/-/-/-

violin1	341	349.199			3/29/-/-
violin2	341	349.242			3/29/-/-
INTERNAL RESONANCES					
butterfly(mode 7)		6746.625	1.5x10^6	1000000	-/24/3/24
butterfly(mode 8)		6746.992		1.77x10^6	-/24/-/24
drumhead (aliased)		6993.96 (freq deviation of -1x10^-5 to 5x10-5)			-/28/-/-
drumhead(un-aliased)		9390.04	1.3x10^6	230000	-/28/3/24
mode 10		11202.516		6.3x10^5	-/24/-/24
mode 14		12545.640		1.5x10^6	-/24/-/24
mode 15		12546.391		1.4x10^6	-/24/-/24
breathing (mode 16)		14370.159		6.7x10^6	-/24/-/24
2nd drum head (mode 32)		22317.203		8.6x10^6	-/24/-/24

End Test Mass (ETM) Resonances (H2)

H2 ETMx

Description	**f_{th}(Hz)**	**f_{meas}(Hz)**	**Q_{th}**	**Q_{meas}**	**References**
PENDULAR RESONANCES					
pendular	.744	.750			3/26/-/-
sideways pendular		.736			3/26/-/-
pitch	.600	.641			3/26/-/-
yaw	.500		.456		3/26/-/-
vertical	12.85	9.886,12.00			3/21/-/-

roll					-/-/-/-
violin1	336	343.816			3/29/-/-
violin2	336	344.051			3/29/-/-
INTERNAL RESONANCES					
butterfly	6595	6639.00		2.8x10^6	4/20/-/20
butterfly	6595	6639.0			4/-/-/-
drumhead (aliased)		7129.71 (freq deviation of +/-2x10^-5)			-/28/-/-
drumhead (un-aliased)	9206	9254.29		7.8x10^4	4/28/-/20
	11217				4/-/-/-
	11217				4/-/-/-
	12056				4/-/-/-
	12057				4/-/-/-
	12941				4/-/-/-
	12943				4/-/-/-
longitudinal (mode 16)	14475	14374		7.3x10^6	4/20/-/20

H2 ETMy

Description	**f_{th}(Hz)**	**f_{meas}(Hz)**	**Q_{th}**	**Q_{meas}**	**References**
PENDULAR RESONANCES					
pendular	.744	.765			3/26/-/-
sideways pendular		.733			3/26/-/-
pitch	.600	.629			3/26/-/-
yaw	.500	.498			3/26/-/-

vertical	12.85	10.743			3/21/-/-
roll					-/-/-/-
violin1	336	343.742			3/29/-/-
violin2	336	344.082			3/29/-/-
INTERNAL RESONANCES					
butterfly	6595				4/24/-/24
butterfly	6595				4/-/-/-
drumhead (aliased)		7134.55 (freq deviation of +/-2x10^-5)			-/28/-/-
drumhead (un-aliased)	9206	9249.45			4/28/-/24
	11217				4/-/-/-
	11217				4/-/-/-
	12056				4/-/-/-
	12057				4/-/-/-
	12941				4/-/-/-
	12943				4/-/-/-
longitudinal	14475				4/20/-/20

Folding Mirror (FM) Resonances (H2)

H2 FMx

Description	**f_{th}(Hz)**	**f_{meas}(Hz)**	**Q_{th}**	**Q_{meas}**	**References**
PENDULAR RESONANCES					
pendular	.744	.772			3/26/-/-

sideways pendular		.764			-/26/-/-
pitch	.600	.617			3/26/-/-
yaw	.500	.503			3/26/-/-
vertical	12.85	11.723,12.052			3/21/-/-
roll		17.589			-/21/-/-
violin	336				3/-/-/-
INTERNAL RESONANCES					

H2 FMy

Description	**f_{th}(Hz)**	**f_{meas}(Hz)**	**Q_{th}**	**Q_{meas}**	**References**
PENDULAR RESONANCES					
pendular	.744	.743			3/26/-/-
sideways pendular		.776?			-/26/-/-
pitch	.600	.656			3/26/-/-
yaw	.500	.427			3/26/-/-
vertical	12.85	11.725,12.061			3/21/-/-
roll		17.610			-/21/-/-
violin	336	335			3/21/-/-
INTERNAL RESONANCES					

Recycling Mirror (RM) Resonances (H2)

Description	**f_{th}(Hz)**	**f_{meas}(Hz)**	**Q_{th}**	**Q_{meas}**	**References**

PENDULAR RESONANCES					
pendular	.741	.817			3/26/-/-
sideways pendular		.826?			-/26/-/-
pitch	.600	.708			3/26/-/-
yaw	.501	.451			3/26/-/-
vertical	12.86	12.368			3/21/-/-
roll		17.891			-/9/-/-
violin	334	335			3/-/-/-
INTERNAL RESONANCES					

MMT3 Mirror (MMT3) Resonances (H2)

Description	**f_{th}(Hz)**	**f_{meas}(Hz)**	**Q_{th}**	**Q_{meas}**	**References**
PENDULAR RESONANCES					
pendular		.766			-/26/-/-
sideways pendular		??			-/26/-/-
pitch		.646			-/26/-/-
yaw		.516			-/26/-/-
vertical					-/-/-/-
roll					-/-/-/-
violin					-/-/-/-
INTERNAL RESONANCES					

Small Optic Suspension (SOS) Resonances (H2)

Description	f_{th}(Hz)	f_{meas}(Hz)	Q_{th}	Q_{meas}	References
ASSOCIATED RESONANCES					
Dumbbell Assembly		9700		130	-/15/-/-
Suspension Support Structure		156			-/15/-/-
PENDULAR RESONANCES					
mc1					
pendular	1.0	.979			15/26/-/-
sideways pendular		1.003			-/26/-/-
pitch	.75	.754			15/26/-/-
yaw	.85	.840			15/26/-/-
mc2					
pendular	1.0	.967			15/26/-/-
sideways pendular		1.003			-/26/-/-
pitch	.75	.696			15/26/-/-
yaw	.85	.862			15/26/-/-
mc3					
pendular	1.0	.995			15/26/-/-
sideways pendular		.999			-/26/-/-
pitch	.75	.696			15/26/-/-
yaw	.85	.862			15/26/-/-
mmt1					
pendular	1.0	.978			15/26/-/-
sideways pendular		.996			-/26/-/-
pitch	.75	.742			15/26/-/-
yaw	.85	.868			15/26/-/-

mmt2					
pendular	1.0	.979			15/26/-/-
sideways pendular		.994			-/26/-/-
pitch	.75	.746			15/26/-/-
yaw	.85	.821			15/26/-/-
sm1					
pendular	1.0	.977			15/26/-/-
sideways pendular		.990			-/26/-/-
pitch	.75	.664			15/26/-/-
yaw	.85	.833			15/26/-/-
sm2					
pendular	1.0	.984			15/26/-/-
sideways pendular		1.011			-/26/-/-
pitch	.75	.711			15/26/-/-
yaw	.85	.776			15/26/-/-
vertical	16.0	14.75			15/13/-/-
roll					-/-/-/-
violin1		708.30		2.2x10^5	-/13/-/13
violin2		1416.34		6.7x10^5	-/13/-/13

Optical Lever Resonances (H2)

Location	frequency(Hz)	FWHM	References (date of measurement
MMT3	9.9,11.1,144.4,218,233,295,351.7,383.4,424.7,490		22 (July 25, 2003)

RM	136.6,147.9,152.6,160.4,219.5	2.3,4,2.5,2.1,1.4	22/22(July 28, 2003
BS	36,39.9,151.5,152.6	1.4,1.6,2.1,2.5	22/22 (July 24, 2003)
ITMx	17.9,25.4,26.9,35.6,211.8,345.6	1.8,.9,1.6,1.6,1.1,2.7	22/22 (July 28, 2003)
ITMy	15.9,25.5,28,34.9,48.4,52.6,266.4,269.1,405.1	2.3,2.1,2.4,1.4,1.6,2.5,_,1.4,_	22/22 (July 25,2003)
ETMx	25.1,27.5,66.5,105.1,169.2	3.4,2.9,2.4,2.6,1.9	22/22 (July 24,2003)
ETMy	21.9,27.2,47.7,54.1,92.6,196.6	2.5,1.8,2.4,_,2.4,_	22/22(July 24,2003)
FMx	34.5,81	1.8,2.3	22/22(July 25, 2003)
FMy	11.4,32.4,138.7,159.3,424.2,679.3	1.3,_,12.1,6.1,6.9,7	22/22(July 28, 2003)

Violin Mode Resonances (H2)

Frequency	Q Value	Sources	References
223		Beamsplitter Pendular **Resonance** (H2 & H1)	3
334		RM Pendular **Resonance** (H2)	3
336		FM(y)Pendular **Resonance**s	3
341		ITM Pendular **Resonance**(H2)	3
343.59		Violin Mode?	elog: 2/23/2003
343.68		Violin Mode?	elog: 2/23/2003
343.7501	13.750e4	MMT1_LR	23
343.754		ETMy	elog: 10/16/2001
343.814	8x10^4	ETMx	elog: 8/27/2002
343.8149	12.734e4	ETMy?	23
344.0508	9.054e4	MMT1?	23
344.051	7x10^4	ETMx	elog: 8/27/2002
344.1018	13.764x10e4	MMT1?	23

344.102		Violin Mode?	elog: 2/23/2003
344.110		ETMy	elog: 10/16/2001
349.1996	13.431e4	ITMx?	23
349.201		ITMx??	elog: 10/16/2001
349.2428	15.184e4	MMT1_LL	23
349.245		BS?	elog: 10/16/2001
349.2817	15.186e4	BS?	23
349.282		BS?	elog: 10/16/2001
349.6566	17.483e4	ITMy?	23
349.659		ITMy?	elog: 10/16/2001
687.4467			23
687.45		Violin Mode?	elog: 2/23/2003
687.67			elog: 2/23/2003
687.6720			23
688		Violin **Resonance** Y-arm	elog: 12/4/2002
688.18		Violin Mode?	elog: 2/23/2003
688.1839			23
688.2552			23
688.26		Violin Mode?	elog: 2/23/2003
698.45			elog: 2/23/2003
698.4543			23
698.5652			23
698.57		Violin Mode?	elog: 2/23/2003
698.64		Violin Mode?	elog: 2/23/2003
698.6434			23

699.3785			23
699.58		Violin Mode?	elog: 2/23/2003
708.30		Small opticss suspension system **resonance**s	13
1031.3595			23
694.5960			23
695.5974	1.069e5		elog: 8/12
695.4212	1.440e5		elog: 8/12
695.4199			23
695.4811			23
695.4828	1.503e5		elog: 8/12
708.30		Small optics suspension system **resonance**s	13
1031.3595			23
1031.6298			23
1032.4419			23
1047.8365			23
1048.0275			23
1048.1847			23
1049.2395			23
1375.5286			23
1375.8970			23
1376.8970			23
1377.1250			23
1397.1262			23
1397.4747			23
1397.6244			23

1397.8887			
1416.34		Small optics suspension system **resonance**s	13
1719.9970			23
1720.3925			23
1720.3945			23
1721.726			23
1721.9262			23
1747.3425			23
1747.878			23

Magnet Standoff Assembly Resonances (H2)

Pathfinder Resonances (H2)

Description	f_{th}(Hz)	f_{meas}(Hz)	Q_{th}	Q_{meas}	References
with Dumpbell Standoffs					
		9476.4		1.3x10^6	-/5/-/5
		22421.5		4.6x10^5	-/5/-/5
		25632.3		2.6x10^6	-/5/-/5
		29484.2		1.1x10^6	-/5/-/5
		29866.2		not measureable	-/5/-/5
		38763.2		8.8x10^5	-/5/-/5
		42758.3		4.8x10^6	-/5/-/5
		47332.4		5.4x10^6	-/5/-/5
magnet/standoff assembly attached to pathfinder					

		9700		130	-/5/-/5
		34600		>30	-/5/-/5

Calculated Resonance Frequencies Of The Periscope Basic

Mode No.	Resonance Frequencies (Hz)	References
1	203	16
2	301	16
3	317	16
4	659	16
5	748	16
6	820	16

Horizontal Acces Module (HAM) Resonances (H1)

Description	f_{th}(Hz)	f_{meas}(Hz)	Q_{th}	Q_{meas}	References
Vert-Vert (w-w) Transfer"""					
	3.3	3.2			8/8/-/-
	7.8	7.8			8/8/-/-
	12.1	12.1			8/8/-/-
Beamline (u-u) Transfer					
	1.5	1.5			8/8/-/-
	2.4	2.3			8/8/-/-
	7.2	7.2			8/8/-/-
	7.7	7.7			8/8/-/-

	9.7	10.1			8/8/-/-
	13.2	13.4			8/8/-/-
Vert-Yaw Transfer					
		3.1			-/8/-/-
		7.2			-/8/-/-
		8.0			-/8/-/-
		9.4			-/8/-/-
		12.1			-/8/-/-
		13.4			-/8/-/-
Transverse-Horizontal (v-v) Transfer					
	1.8	1.6			7/7/-/-
	3.2	2.8			7/7/-/-
	7.3	7.3			7/7/-/-
	8.0	8.0			7/7/-/-
	10.0	10.3			7/7/-/-
	13.2	13.4			7/7/-/-

HAM Optic Table Calculated Resonances (H1)

Mode	f_{th}(Hz)	Mode	f_{th}(Hz)
1	250	10	615
2	342	11	622
3	397	12	622
4	457	13	623
5	474	14	628
6	559	15	639

7	584	16	643
8	584	17	645
9	596	18	654

Basic Symmetric Chamber (BSC) Resonances (H1)

Description	f_{th}(Hz)	f_{meas}(Hz)	Q_{th}	Q_{meas}	References
Horizontal-Horizontal Transfer					
	1.3	1.2			7/7/-/-
	2.4	2.2			7/7/-/-
	5.5	5.5			7/7/-/-
	10.0	10.0			7/7/-/-
	13.1	13.1			7/7/-/-
Vertical-Vertical Transfer					
	2.9	2.7			7/7/-/-
	6.5	6.4			7/7/-/-
	10.2	10.3			7/7/-/-
	13.1	13.1			7/7/-/-
Horizontal-Pitch Transfer					
	1.3	1.2			7/7/-/-
	2.4	2.2			7/7/-/-
	6.9	6.5			7/7/-/-
	11.5	11.5			7/7/-/-
	14.4	14.4			7/7/-/-
Vertical-Vertical Transfer					

	2.9	2.7			7/7/-/-
	6.5	6.4			7/7/-/-
	10.3	10.3			7/7/-/-
	13.1	13.1			7/7/-/-

BSC Downtube Resonances (H1)

Description	f_{th}(Hz)	f_{meas}(Hz)	Q_{th}	Q_{meas}	References
	349	349			11/6/-/-
	355	360			11/6/-/-
	370				11/-/-/-
	371	376			11/6/-/-
	399	399			11/6/-/-
	421	420			11/6/-/-
	441				11/-/-/-
	462				11/-/-/-
	463				11/-/-/-
	478				11/-/-/-
	556				11/-/-/-
	560				11/-/-/-
	583				11/-/-/-
	611				11/-/-/-
	615				11/-/-/-
	683				11/-/-/-
	690				11/-/-/-
	702				11/-/-/-

H2 Resonances (last edited 2007-02-02 23:17:13 by BetsyBland)