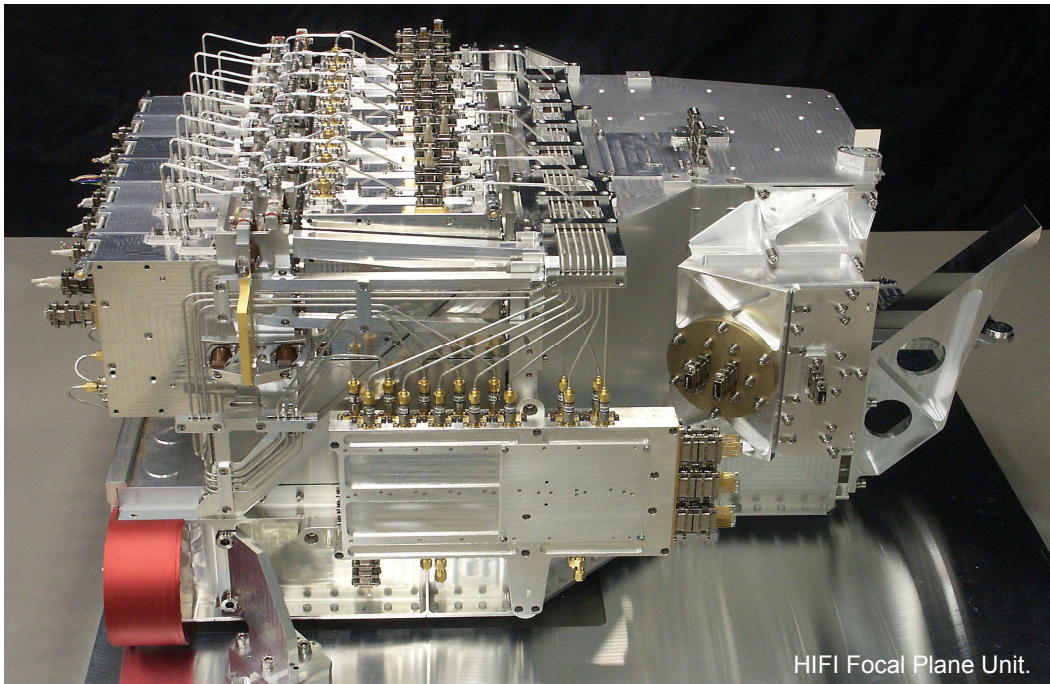


HIFI System-Stability at Selected Line Frequencies, as measured during the ILT-3 phase

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B1a (488-552)				ILT-3 System Allan Time (s)³			
Line	vlo (GHz)^{1,2,5}	vline (GHz)	Proposal	TP-Full	TP-sub⁴	Spec-Full	Spec-sub1^{3,4}
O ₂	494	487.2	key	19.9	35.9	95.7	446.7
H ₂ O	494	488.49	3	x	x	x	x
C	498	492.161	3	19.9	59.8	107.7	255.2
HDO	516	509.329	3	19.9	27.9	139.6	498.5
ND	526	522.077	4	12	12	27.9	203.6
CH	527	532.721	3	20	35.9	159.7	287.5
CH	531	536.761	6	19.9	51.8	107.7	287.2
H ₂ ¹⁸ O-ortho	542	547.676	18	31.9	47.9	111.8	431.3
H ₂ ¹⁷ O-ortho	548	552.021	5	12	16	35.9	203.6
mean				17.5	35.9	102.2	308.7
std				3.6	16.9	48.5	107.8

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-V (slightly better than WBS-H).

⁴ Best WBS-V subband. 600s is the limit of the measurement

⁵ HSPOT LO frequency range: 488.0 - 552.0 GHz

B1b (556-628)				ILT-3 System Allan Time (s)³			
Line	vlo (GHz)^{1,2,5}	vline (GHz)	Proposal	TP-Full	TP-sub⁴	Spec-Full	Spec-sub1^{3,4}
H ₂ O-ortho	563	556.936	19	47.9	47.9	79.9	143.8
HDO	566	559.816	1	35.7	35.7	158.5	443.9
NHh ₃ -ortho	566	572.498	7	x	x	x	x
HDO	593	599.927	2	15.9	19.8	59.4	225.9
D ₂ O	614	607.35	3	15.9	15.9	51.5	225.9
H ₂ O-ortho	618	620.701	4	x	x	x	x
HCO ⁺	618	624.205	1	15.9	19.8	83.2	225.9
H ₂ O ⁺	625	631.773	4	19.8	19.8	71.3	202.1
mean				25.2	29.8	84	244.6
std				13.5	10.7	38.4	102.7

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-V (slightly better than WBS-H).

⁴ Best WBS-V subband. 600s is the limit of the measurement

⁵ HSPOT LO frequency range: 563.4 - 628.2 GHz

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B2a (642-710)				ILT-3 System Allan Time (s)³			
Line	ν_{lo} (GHz) ^{1,2,5}	ν_{line} (GHz)	Proposal	TP-Full	TP-sub ⁴	Spec-Full	Spec-sub1 ^{3,4}
H ₂ O- <i>para</i>	640	645.834	2	16	20	71.9	287.4
H ₂ O18	652.5	647.198	2	7.9	7.9	59.4	202.1
H ₂ O- <i>ortho</i>	652.5	658.007	3	x	x	x	x
H ₂ O18	667	661.356	2	11.9	19.8	95.1	285.4
D ₂ H ⁺	686	691.66	6	47.8	47.8	143.5	287.1
H ₂ O18	698	692.079	2	15.9	19.8	107	495.4
SiO	700	694.275	2	15.9	35.7	122.9	550.9
O ₂	709	715.4	0	11.9	19.8	71.3	400.3
mean				18.2	24.4	95.9	358.4
std				13.4	13.1	30.6	127.5

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-V (slightly better then WBS-H).

⁴ Best WBS-V subband. 600s is the limit of the measurement

⁵ HSPOT LO frequency range: 642.2 - 710.0 GHz

Outside the official frequency range

B2b (724-793)				ILT-3 System Allan Time (s)³			
Line	ν_{lo} (GHz) ^{1,2,5}	ν_{line} (GHz)	Proposal	TP-Full	TP-sub ⁴	Spec-Full	Spec-sub1 ^{3,4}
CS	728	734.32	2	7.9	7.9	59.4	321
H ₂ ¹⁸ O- <i>ortho</i>	739.5	745.32	3	15.9	19.8	83.2	202.1
H ₂ O- <i>ortho</i>	744	750.572	2	15.9	19.8	59.4	321
H ₂ O- <i>para</i>	758	752.033	14	7.9	7.9	95.1	105.1
¹³ CO	765	771.184	2	8.9	11.9	98.7	98.7
HDO	772	766.166	1	11.9	15.9	59.4	321
O ₂	779	773.8	5	11.9	19.8	59.4	285.4
x	788	784	x	12	12	203.6	203.6
mean				11.5	14.4	89.8	259.7
std				3.2	5.2	49	154

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-V (slightly better then WBS-H).

⁴ Best WBS-V subband. 600s is the limit of the measurement

⁵ HSPOT LO frequency range: 724.0 - 793.0 GHz

B3a (807-852)				ILT-3 System Allan Time (s)³				
Line	vlo (GHz) ^{1,2,5}	vline (GHz)	Proposal	TP-Full	TP-sub ⁴	Spec-Full	Spec-sub1 ^{3,4}	
CO	812	806.652	0	8	8	59.9	159.7	
C	814	809.342	3	11.9	11.9	43.6	122.9	
¹³ CH ⁺	823	830.131	5	11.9	11.9	59.4	158.5	
O ₂	827	834.1	?	8	12	35.9	95.8	
CH ⁺	837	835.071	11	4	4	27.9	59.9	
H ₂ CO	849	855.151	0	7.9	7.9	7.9	11.9	
H ₂ O- <i>para</i>	852	859.859	0	11.9	15.9	51.5	225.9	
				mean	9.1	10.2	40.9	119.2
				std	3	3.9	18.7	70.9

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-H (slightly better than WBS-V).

⁴ Best WBS-H subband. 600s is the limit of the measurement

⁵ HSPOT LO frequency range: 807.0 - 852.0

B3b (866-953)				ILT-3 System Allan Time (s)³				
Line	vlo (GHz) ^{1,2,5}	vline (GHz)	Proposal	TP-Full	TP-sub ⁴	Spec-Full	Spec-sub1 ^{3,4}	
H ₂ O- <i>ortho</i>	869	863.855	0	7.9	7.9	19.8	95.1	
¹³ CO	878	881.273	0	8	8	35.9	123.8	
HDO	887	893.639	7	31.7	31.7	79.3	332.9	
D ₂ O	902	897.947	3	7.9	7.9	43.6	83.2	
H ₂ O	912	906.206	0	7.9	7.9	27.7	158.5	
H ₂ O- <i>para</i>	922	916.171	2	15.9	19.8	83.2	321	
COh	928	921.8	6	11.9	11.9	59.4	202.1	
CH ₂	x	945.8	6	x	x	x	x	
NHh ₂	946.5	952.542	6	7.9	7.9	108.5	225.9	
				mean	12.8	13.7	56.6	199.2
				std	7.9	8.4	29	130.8

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-V (slightly better than WBS-H).

⁴ Best WBS-V subband. 600s is the limit of the measurement

⁵ HSPOT LO frequency range: 866.0 - 953.0 GHz

No LO coverage

B4a (957-1053)				ILT-3 System Allan Time (s)³			
Line	vlo (GHz)^{1,2,5}	vline (GHz)	Proposal	TP-Full	TP-sub⁴	Spec-Full	Spec-sub1^{3,4}
NH	968	974.462	13	4	4	19.8	71.3
H ₂ O-ortho	974	968.048	3	7.9	7.9	59.4	225.9
OH ⁺	977.8	971.804	9	11.9	11.9	71.3	202.1
NH	981.2	974.462	13	7.9	11.9	59.4	253.6
H ₃ O ⁺	990.6	984.6	10	11.9	15.9	35.7	202.1
H ₂ O-para	995	987.927	18	16	16	31.9	335.3
H ₂ ¹⁸ O-para	1000.6	994.675	6	4	4	4	7.9
NH ⁺	1006.5	1012.524	5	7.9	7.9	27.7	138.7
CO	1031	1036.912	2	15.9	27.7	83.2	356.7
mean				9.7	11.9	43.6	199.3
std				4.5	7.4	26	113.8

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-V (slightly better then WBS-H).

⁴ Best WBS-V subband. 600s is the limit of the measurement

⁵ HSPOT LO frequency range: 967.0 - 1042 GHz

B4b (1054-1114)				ILT-3 System Allan Time (s)³			
Line	vlo (GHz)^{1,2,5}	vline (GHz)	Proposal	TP-Full	TP-sub⁴	Spec-Full	Spec-sub1^{3,4}
HCN	1068	1062.983	0	11.9	15.9	51.5	178.3
H ₂ S	1080	1072.8	0	20	27.9	43.9	203.6
H ₂ O18	1089.6	1095.627	6	15.9	19.8	27.7	107
H ₂ O-ortho	1091.3	1097.364	12	15.9	27.7	33.6	43.6
C ¹³ Oh	1095	1101.35	10	19.8	19.8	59.8	178.3
H ₂ ¹⁸ O-para	1107	1101.698	18	11.9	19.8	42.9	178.3
H ₂ O-para	1108	1113.343	20	15.9	15.9	63.4	174.4
H ₂ O+	1110	1115.086	7	11.9	19.8	51.9	138.7
mean				15.4	20.8	46.8	150.3
std				3.3	4.6	12.3	52.3

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-V (slightly better then WBS-H).

⁴ Best WBS-V subband. 600s is the limit of the measurement

⁵ HSPOT LO frequency range: 1056.0 - 1113.0 GHz

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B5a (1127-1178)				ILT-3 System Allan Time (s)³				
Line	vlo (GHz)^{1,2,5}	vline (GHz)	Proposal	TP-Full	TP-sub⁴	Spec-Full	Spec-sub1^{3,4}	
O ₂	1127	1120.715	3	19.8	27.7	95.1	356.7	
H ₂ O+	1145.5	1139.515	2	31.9	47.9	111.8	239.6	
CO	1145.5	1151.985	13	x	x	x	x	
H ₂ O-ortho	1159	1153.118	9	15.9	27.7	107	253.6	
H ₂ O-ortho	1164	1158.324	3	15.9	27.7	95.1	321	
H ₂ O-ortho	1168	1162.931	3	27.7	35.7	138.7	285.4	
H ₂ O-para	1168	1172.448	0	x	x	x	x	
H ₂ ¹⁸ O-ortho	1187	1181.394	0	15.9	27.7	107	550.9	
H ₂ O-para	1202	1207.666	6	15.9	27.7	83.2	285.4	
				mean	20.4	31.8	119.2	322.7
				std	6.7	7.7	30.4	111.7

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-V (slightly better than WBS-H).

⁴ Best WBS-V subband. 600s is the limit of the measurement

⁵ HSPOT LO frequency range: 1116.0 - 1178.0 GHz

Outside the official frequency range

B5b (1192-1242)				ILT-3 System Allan Time (s)³				
Line	vlo (GHz)^{1,2,5}	vline (GHz)	Proposal	TP-Full	TP-sub⁴	Spec-Full	Spec-sub1^{3,4}	
H ₂ CO	1180	1185	0	20	27.9	71.9	123.8	
H ₂ O-ortho	1191	1196.859	0	19.8	27.7	95.1	178.3	
H ₂ O-para	1202	1207.666	6	19.8	27.7	122.9	178.3	
NH ₃	1209	1214.859	4	15.9	27.7	145.9	225.9	
HDO	1223	1217.3	10	x	x	x	x	
H ₂ O-para	1223	1228.799	18	31.9	31.9	79.9	287.5	
H ₂ O-para	1235	1228.799	18	19.8	43.6	83.2	253.6	
HF	1238	1232.476	7	12	20	71.9	123.8	
				mean	19.9	29.5	95.8	216.2
				std	6.1	7.2	28.3	90.3

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-V (slightly better than WBS-H).

⁴ Best WBS-V subband. 600s is the limit of the measurement

⁵ HSPOT LO frequency range: 1192.0 - 1242.0 GHz

Outside the official frequency range

B6a (1429-1570)				ILT-3 System Allan Time (s)³			
Line	vlo (GHz)^{1,2,5}	vline (GHz)	Proposal	TP-Full	TP-sub⁴	Spec-Full	Spec-sub1^{3,4}
H ₂ O	1444	1440.782	0	x	x	x	x
HCl+	1447	1444	0	3	4	30.7	123.9
N II	1457.5	1461.134	4	7.9	7.9	15.9	15.9
D ₂ H ⁺	1480.2	1476.6	3	1	2	3	10.9
CH	1480.2	1477.292	0	x	x	x	x
CO	1493.3	1496.923	3	1	2	3	10.9
H	1529	1532.6	0	3	3	6.9	44.6
¹³ CO	1544.5	1540.988	0	3	3	17.9	50.5
	1548	1551.6	0	8	8	16	35.9
mean				3.8	4.3	13.3	41.8
std				2.9	2.6	9.9	39.7

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-V (slightly better then WBS-H).

⁴ Best WBS-V subband. 600s is the limit of the measurement

⁵ HSPOT LO frequency range: 1408.0 - 1575.0 GHz

B6b (1578-1695)				ILT-3 System Allan Time (s)³			
Line	vlo (GHz)^{1,2,5}	vline (GHz)	Proposal	TP-Full	TP-sub⁴	Spec-Full	Spec-sub1^{3,4}
x	1581.4	1585	0	3	4	23.8	71.3
CO	1608	1611.793	0	4	5	26.8	80.3
H ₂ ¹⁸ O	1630	1633.484	0	8	8	27.9	71.9
¹³ CH	1643.6	1647.239	4	3	5	23.8	89.2
H ₂ O ⁺	1653	1655.813	9	3	2	8.9	12.9
CH	1652.8	1656.961	8	x	x	x	x
H ₂ O-ortho	1665.2	1661.011	5	3	4	17.8	71.3
H ₂ ¹⁷ O-ortho	1665.2	1662.464	3	x	x	x	x
H ₂ O-ortho	1667.4	1669.905	21	4	4	12	27.9
x	1686	1689	2	8	8	4	27.9
x	1692	1689	2	3	3	14.9	39.6
mean				4.3	4.8	17.8	54.7
std				2.1	2.5	8.4	27.6

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-V (slightly better then WBS-H).

⁴ Best WBS-V subband. Ta=600s is the limit of the measurement

⁵ HSPOT LO frequency range: 1528.0 - 1696.0 GHz

B7a (1700-1800)				ILT-3 System Allan Time (s)³			
Line	vlo (GHz)^{1,2,5}	vline (GHz)	Proposal	TP-Full	TP-sub⁴	Spec-Full	Spec-sub1^{3,4}
H ₂ O-ortho	1716.5	1713.94	1	2	2	4	23.8
H ₂ ¹⁸ O	1723	1719.25	0	15.9	15.9	20	35.9
H ₂ O-ortho	1720.3	1716.765	8	x	x	x	x
CO	1730.2	1726.602	3	3	4	34.7	80.3
H ₂ O-ortho	1757.2	1753.888	3	3	3	20.8	50.5
¹³ CO	1757.2	1760.486	3	x	x	x	x
H ₂ O-para	1762.5	1766.121	0	2	2	5	34.7
HCN	1773.5	1769.876	0	8.9	10.9	26.8	89.2
H ₂ O-ortho	1794	1797.238	0	2	2	17.8	63.4
			mean	5.3	5.7	18.4	54
			std	5.3	5.5	11	24.6

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-V (slightly better then WBS-H).

⁴ Best WBS-V subband. 600s is the limit of the measurement

⁵ HSPOT LO frequency range: 1664.0 - 1845.0 GHz

B7b (1720-1905)				ILT-3 System Allan Time (s)^{3,5}			
Line	vlo (GHz)^{1,2,6}	vline (GHz)	Proposal	TP-Full	TP-sub⁴	Spec-Full	Spec-sub1^{3,4}
CO	1728	1726.602	3	12	12	43.9	71.9
H ₂ O-ortho	1801	1797.238	1	2	2	2	5
OH	1834	1837.747	7	2	2	2	4
CO	1845	1841.346	9	2	2	2	5
H ₂ O-ortho	1872	1867.825	6	2	2	2	3
HCl	1872	1876.23	3	x	x	x	x
CH4	1885.6	1882	3	2	2	3	6.9
¹³ C ⁺	1897	1900.545	21	8	8	35.9	83.8
CH2	1904.1	1907.987	3	x	x	x	x
			mean	4.3	4.3	13	25.7
			std	4.1	4.1	18.5	35.8

¹ LO frequency, selected for homogeneous coverage

² Vectors scans from 17 May 2007, with final Optical Attn.

³ WBS-V (slightly better then WBS-H).

⁴ Best WBS-V subband. Ta=600s is the limit of the measurement

⁵ The B7b LO is most stable at the band edges (driven hard?).

⁶ HSPOT LO frequency range: 1719.0 - 1908.0 GHz

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