



Status of Astrowatch

Evan Goetz
for the Astrowatch Team

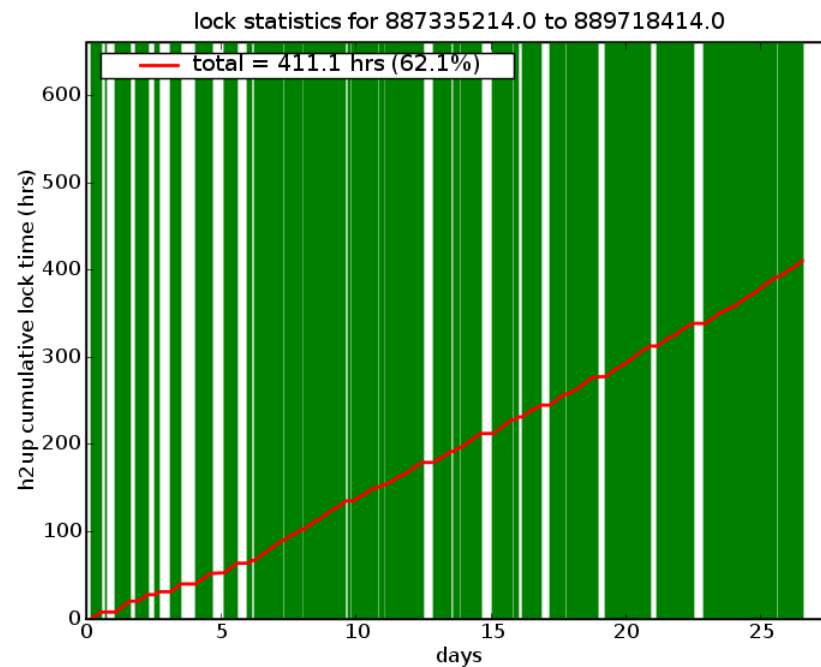
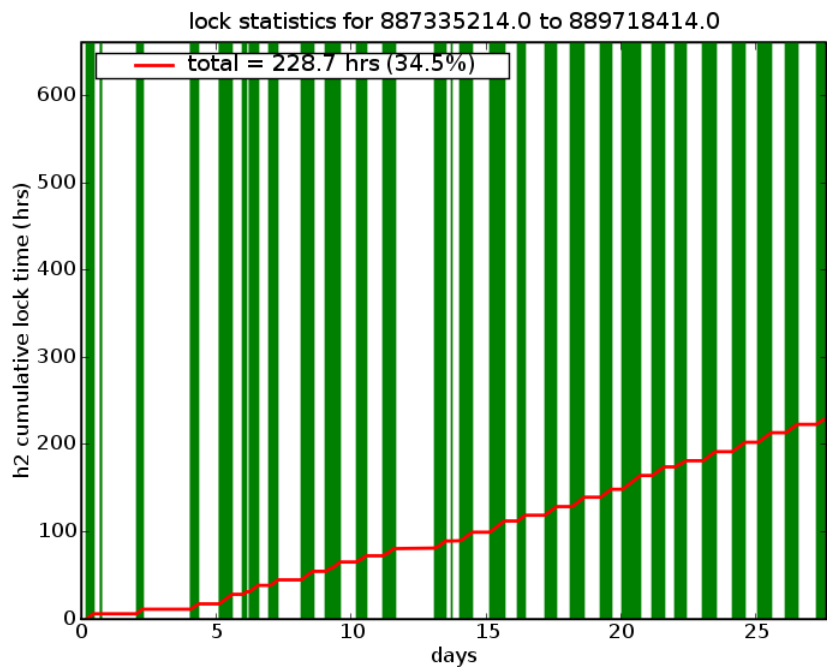
March 2008 LSC-VIRGO meeting

Goals of Astrowatch

- Maintain coverage for triggered astrophysical events during the period between S5 and S6
- LIGO H2 and GEO600 provide this coverage
- Allow opportunities for students to interact, learn and gain knowledge of how gravity wave detectors work, make improvements to the detector, and understand the instrumentation

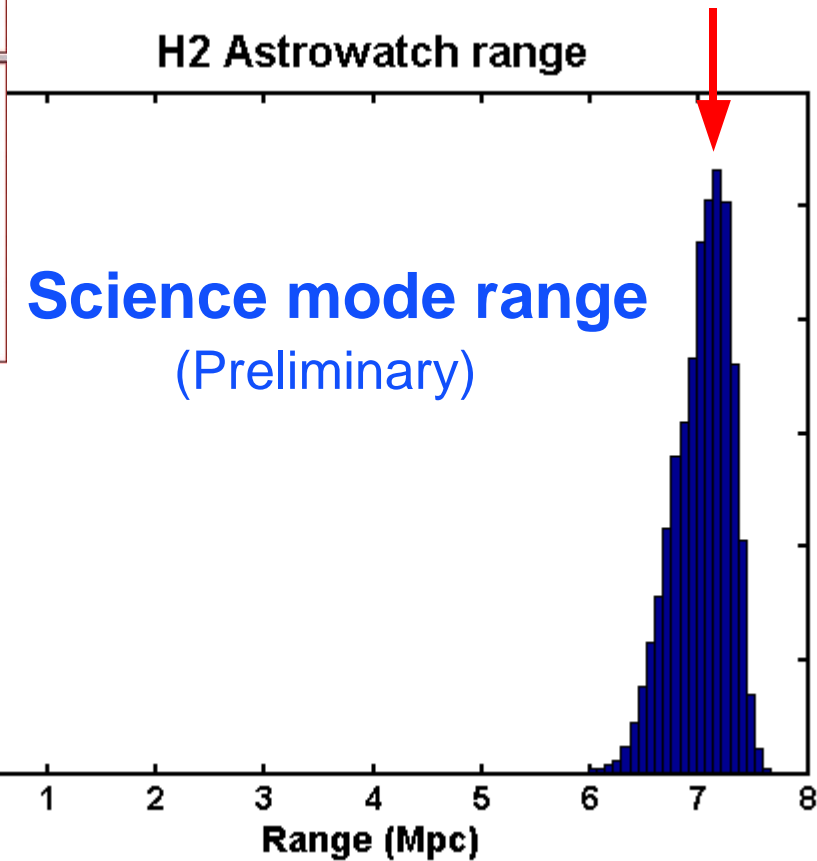
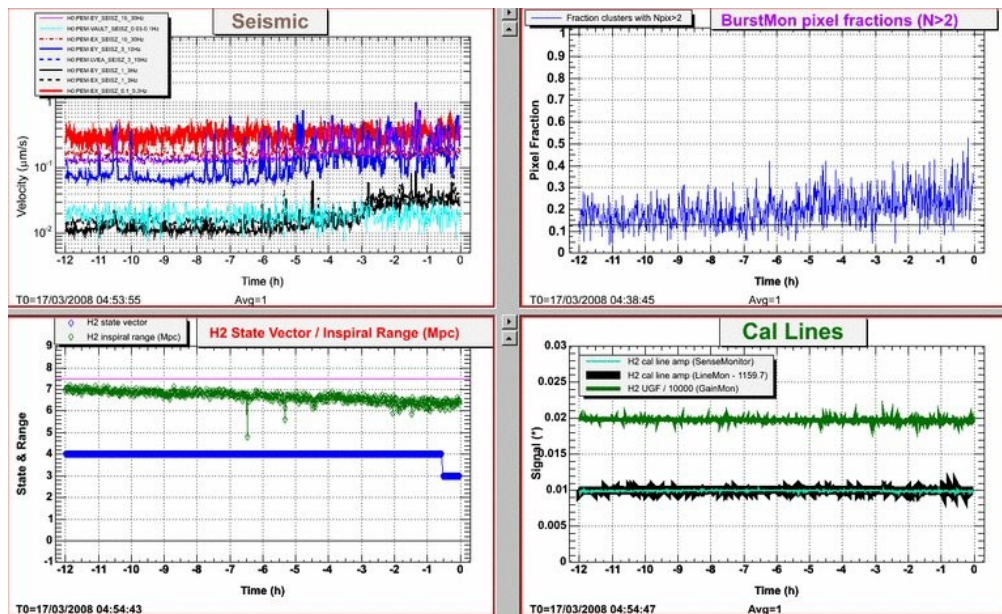
Current H2 status

- Running at ~ 7 Mpc (updated calibration in the works)
- $\sim 33\%$ duty factor for Science Mode
- $\sim 60\%$ duty factor for Up state

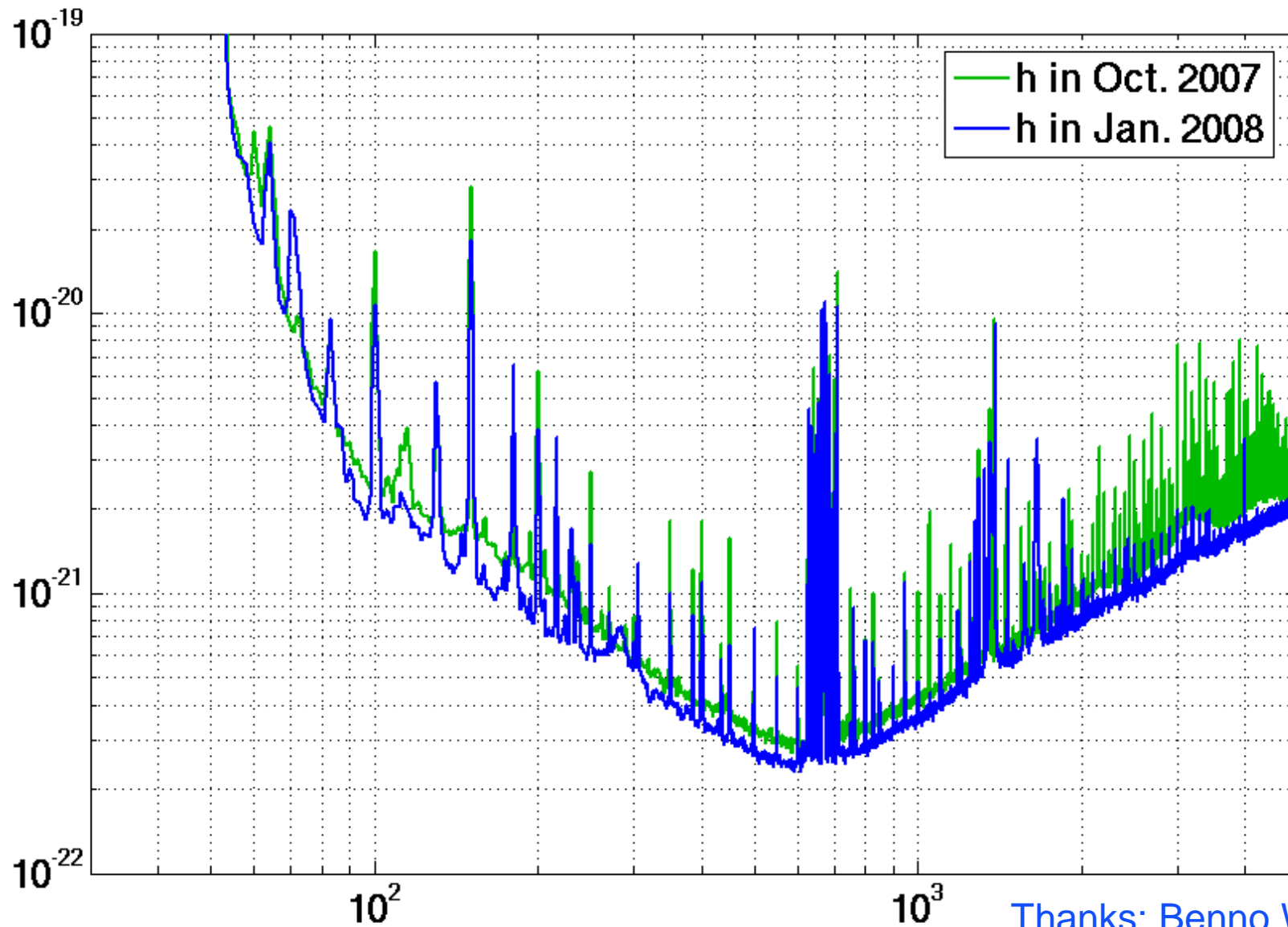


From Justin Garofoli

H2 Astrowatch figures of merit

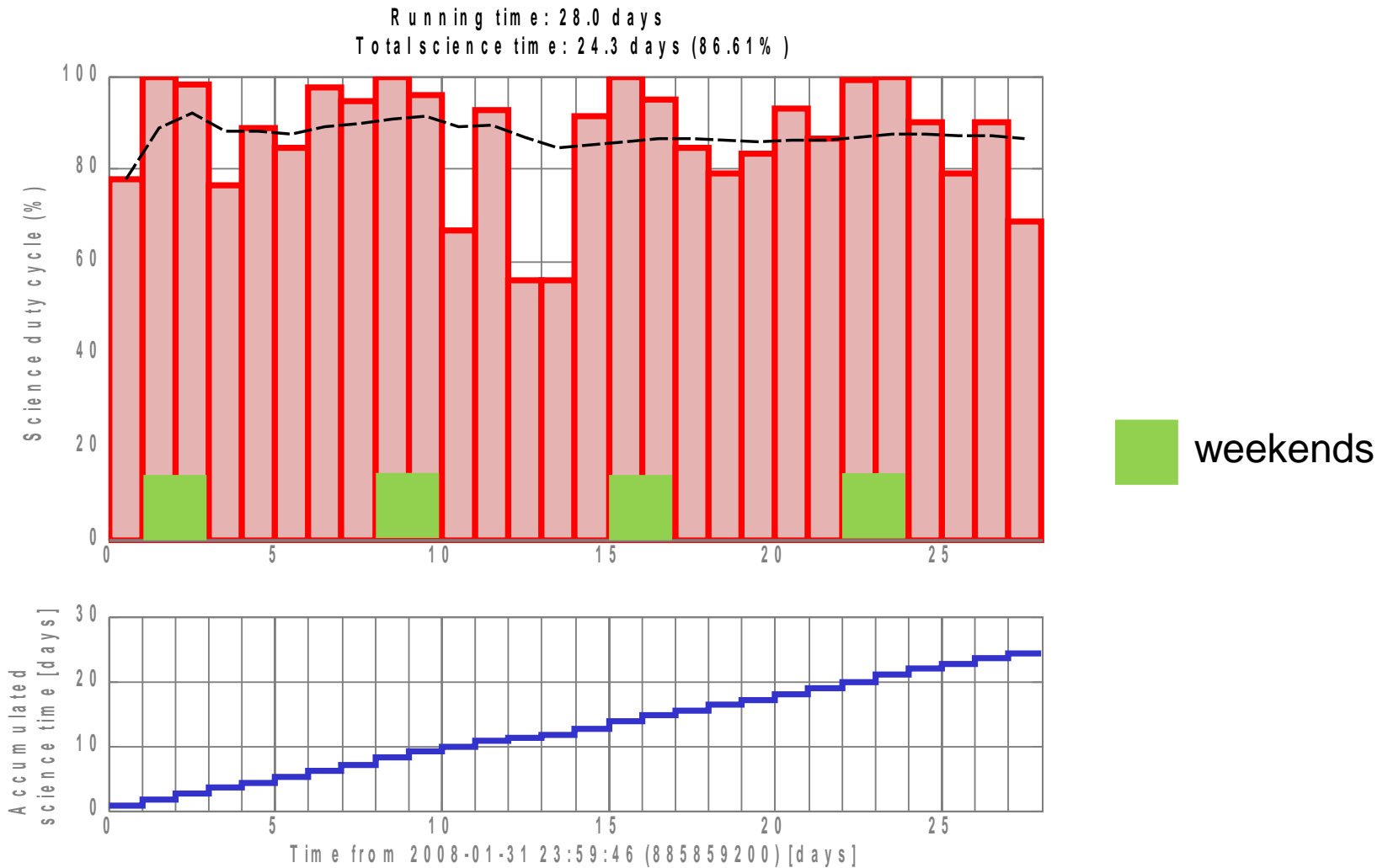


Current GEO600 status



Thanks: Benno Willke

GEO600 figure of merit



Thanks: Benno Willke

H2 Astrowatch

- Current students at LHO:
 - » Berit Behnke (AEI), Evan Goetz (U of M), Pinkesh Patel (Caltech), Philip Roberts (Andrews U), Jacob Slutsky (LSU), Junyi Zhang (U of M)
- Accelerated training began February 6th
 - » Short delay caused by H2 vent work
- First shifts began February 17th (on schedule!)
- Current Science Mode shifts are nominally 8pm – 4am
 - » Max science duty factor just from shifts is 33%
 - » SM continues well into morning – Overcoming downtime during shifts
- Current limitation on Science Mode duty factor is man-power

GRB triggers

GCN number	GRB Date	redshift	UT time	GPS seconds	RA (deg)	Dec (deg)	GRB duration (sec)	GRB fluence (E-7 ergs/cm ²)	Fave LHO	Fave LLO	Fave GEO	Fave VRG	LHO-LLO time delay (sec)	LHO-GEO time delay (sec)	LLO-GEO time delay (sec)	LHO-VRG time delay (sec)	LLO-VRG time delay (sec)	GEO-VRG time delay (sec)
07416	080315	--	02:25:01	889583115.000	155.182	41.729	--	--	0.516	0.610	0.518	0.522	0.0033310	0.0006255	-0.0027054	-0.0001477	-0.0034787	-0.0001477
07382	080310	--	08:37:58	889173492.000	220.081	-0.166	--	--	0.428	0.601	0.274	0.265	0.0069055	-0.0104210	-0.0173265	-0.0105032	-0.0174087	-0.0001477
07362	080307	--	11:23:30	888924224.000	136.633	35.168	--	--	0.375	0.150	0.015	0.353	-0.0095325	-0.0104541	-0.0009216	-0.0132969	-0.0037644	-0.0001477
07351	080303	--	09:10:35	888570649.000	112.073	-70.240	--	--	0.433	0.363	0.667	0.625	0.0017689	-0.0074132	-0.0091820	-0.0061471	-0.0079160	0.0001477
07340	080229B	--	23:33:01	888363195.000	199.221	-64.878	--	--	0.666	0.541	0.443	0.285	0.0044686	0.0091922	0.0047236	0.0119822	0.0075137	0.0001477
07335	080229	--	17:04:59	888339913.000	228.217	-14.712	--	--	0.336	0.359	0.543	0.603	-0.0061497	-0.0178461	-0.0116964	-0.0194468	-0.0132971	-0.0001477
07295	080211	--	07:23:40	886749834.000	43.968	60.035	--	--	0.497	0.359	0.315	0.388	-0.0083492	-0.0041680	0.0041812	-0.0069052	0.0014440	-0.0001477
07256	080204	--	13:56:32	886168606.000	n/a	n/a	--	--	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
07314	080218B	--	23:57:47	887414281.000	177.951	-53.100	--	--	0.663	0.490	0.369	0.189	0.0056127	0.0138020	0.0081893	0.0168878	0.0112751	0.0001477
07313	080218	--	20:08:42	887400536.000	355.922	12.175	--	--	0.559	0.670	0.060	0.354	0.0039141	-0.0158207	-0.0197348	-0.0170195	-0.0209336	-0.0001477
07296	080212	--	17:34:33	886872887.000	231.107	-22.752	--	--	0.352	0.353	0.616	0.660	-0.0041262	-0.0202177	-0.0160915	-0.0215563	-0.0174301	-0.0001477
07281	080210	--	07:50:05	886665019.000	251.270	13.830	--	--	0.338	0.354	0.538	0.601	0.0061761	0.0181511	0.0119750	0.0198048	0.0136287	0.0001477
07264	080207	--	21:30:21	886455035.000	207.513	7.514	--	--	0.371	0.547	0.328	0.180	-0.0079246	0.0083636	0.0162882	0.0079513	0.0158759	-0.0001477

- Since 17 February (start of H2 astrowatch):
 - » 6 GRB triggers
 - » H2 in Science Mode for 3 of the triggers!
 - » H2 in Science within 15 minutes of two GRB triggers
 - » H2 in Power Up during remaining GRB trigger

Thanks to: Isabel Leonor, Berit Behnke

H2 commissioning to date

- Earthquake stop swap (D. Cook, J. Garofoli, C. Vorvick)
- PAM gaps adjusted and coil bias relieved (D. Cook, J. Garofoli, C. Vorvick)
- Calibration investigations (E. Goetz, R. Savage, et. al.)
- H2 AS port table adjustments (B. Bland, A. Effler, E. Goetz, C. Reed)
- MC absorption (B. Behnke, J. Zhang)
- ASQ saturation alarms addressed (A. Effler, P. Patel)
- Acoustic tuning (R. Schofield, P. Patel)

Current commissioning efforts

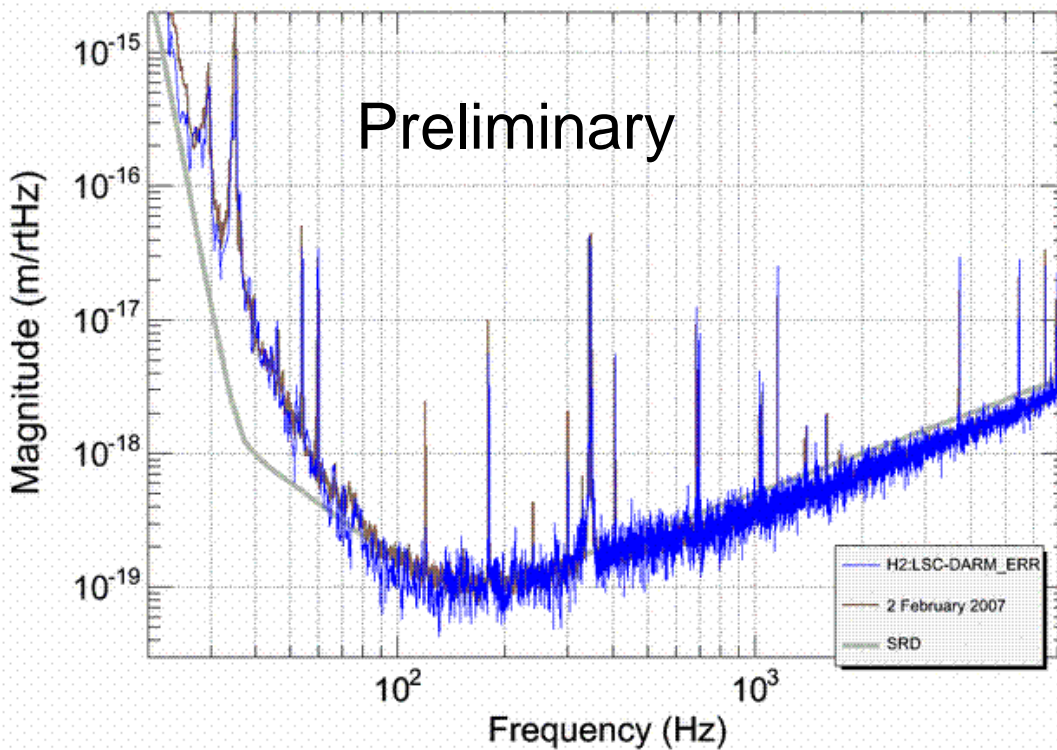
- Higher power into H2 (E. Hirose, B. Behnke)
- Angular stability studies (E. Hirose, K. Kawabe)
- OSEM diagonalization (P. Patel, J. Zhang)
- ASPD5 trigger fix (P. Roberts)
- Force-to-pitch work for the TM coils (J. Slutsky)

H2 sensitivity improvements

- Following PAM gap adjustments, cage rotation and EQ stop change for H2 TMs

Calibrated H2:DARM_ERR

Preliminary

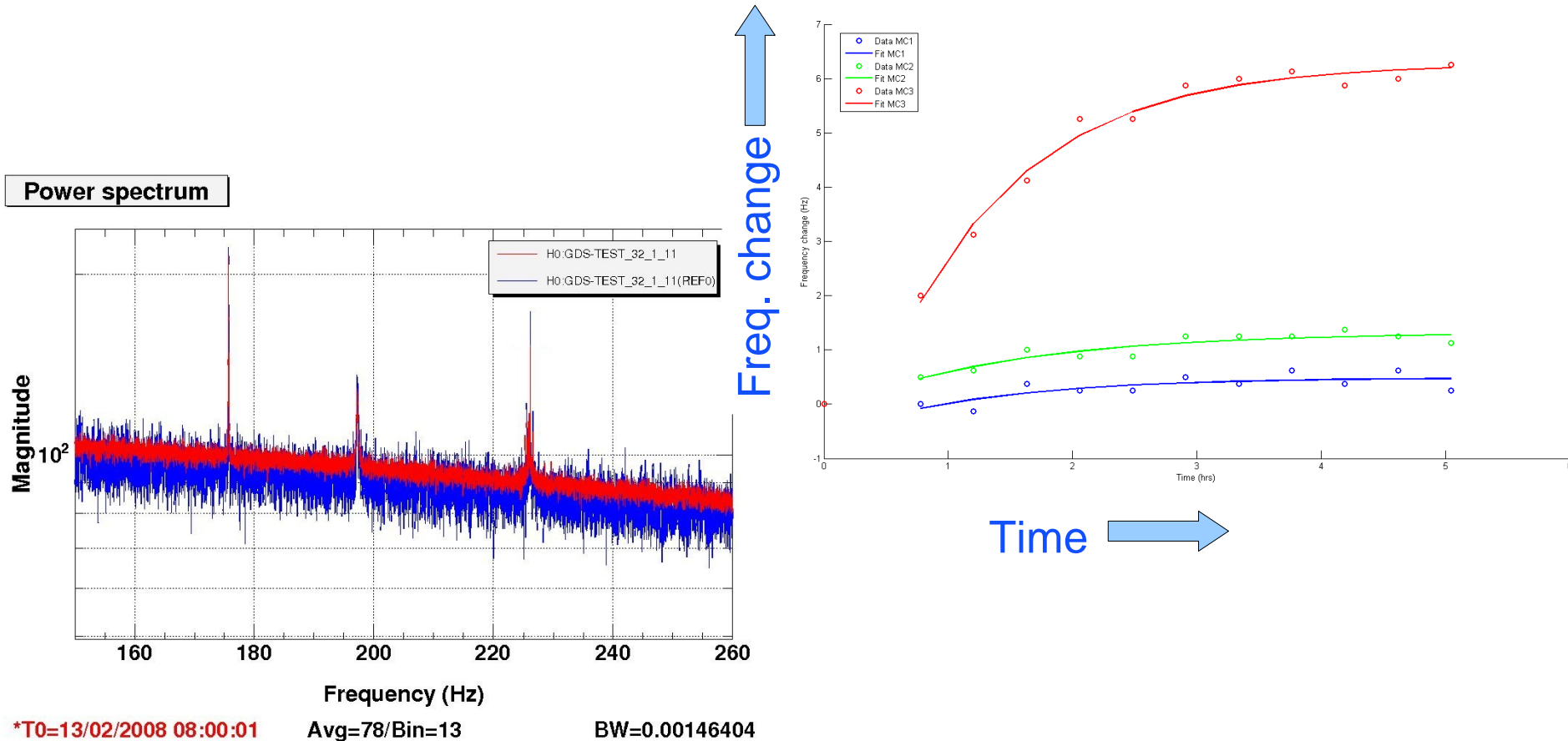


- Calibration measurements have been made
- Need validation and updates to response function

Mode cleaner absorption

(B. Behnke, J. Zhang)

- Measurement to understand laser beam absorption in mode cleaner optics of H2



Astrowatch recap and future

- Astrowatch has shown great successes:
 - » Range, duty factor, etc.
- Anticipate some modest increases in sensitivity with some efforts by students
- Plenty of opportunities for further H2 improvements and eLIGO work at LHO
- Would like more volunteers for Astrowatch work
 - » Visiting SciMons would permit additional coverage