

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
HAYSTACK OBSERVATORY
 WESTFORD, MASSACHUSETTS 01886

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Telephone: 617-715-5533

Fax: 617-715-0590

To: EDGES Group

From: Alan E.E. Rogers

Subject: Signature search for midband and lowband2 vs GHA.

A search for an absorption signature with a fixed value of $\tau = 7$ has been made using midband data from 2018_146 to 2018_218 and lowband2 data from 2017_1818 to 2018_036 for GHA blocks of 4 hours centered at 0, 4, 8, 12, 16 and 20 hours. Figure 1 shows the residuals of midband data with 5 quasi-physical terms removed and Figures 2 through 7 show the signature search plots for each 4 hour block.

Tables 1 and 2 show the values of the best fit absorption signatures for midband and lowband2.

GHA	Center MHz	SNR	Amp K	Width MHz	rms1 mK	rms2 mK	T75 K
0	78.9	9.6	0.47	22.5	94.5	73.4	4618
4	82.8	21.9	0.92	18.7	213.1	101.4	2769
8	79.7	33.0	0.50	16.9	106.6	36.1	1580
12	80.1	34.0	0.44	16.6	98.0	32.3	1739
16	78.9	35.5	0.87	19.7	143.5	45.5	2010
20	78.9	25.3	0.55	16.1	121.8	51.7	3149

Table 1. Results of absorption signature search with 5-terms from 55 to 110 MHz using midband data from 2018_146 to 2018_218. Rms 1 and rms 2 are residuals before and after adding best fit signature. T75 is the Foreground temperature at 75 MHz.

GHA	Center MHz	SNR	AMP K	Width MHz	rms 1 mK	rms2 mK	T75 K
0	78.1	7.4	0.54	17.7	65.8	50.4	4611
4	77.0	15.3	1.12	23.9	69.6	34.7	2845
8	76.6	12.5	0.39	22.5	32.4	18.6	1625
12	78.1	15.6	0.64	21.7	42.9	21.0	1702
16	80.2	7.4	0.34	19.4	32.8	25.1	2027
20	79.3	8.7	0.46	18.6	46.3	32.9	3195

Table 2. Results from search with 5-terms from 65-95 MHz using lowband2 data from 2017_181-2018_036.

The values of absorption center frequency, depth and width are fairly consistent with the values of 78 MHz, 0.5 K and 19 MHz reported in Nature 2018. If the center frequency and width are constrained the absorption depths given in Table 3 are obtained with 5-terms removed

GHA	Midband K	Lowband2 K
0	0.33	0.55
4	0.58	0.58
8	0.49	0.29
12	0.47	0.43
16	0.76	0.53
20	0.72	0.34

Table 3. Absorption from best fit with fixed center frequency and width of 78 and 19 MHz respectively.

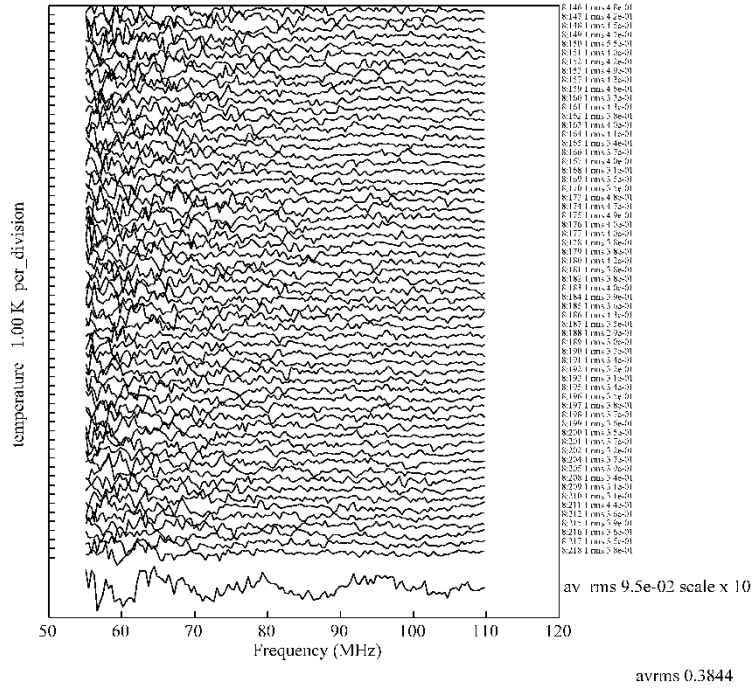


Figure 1. Midband data from 2018_146-2018_218 for GHA 22-02 hours.

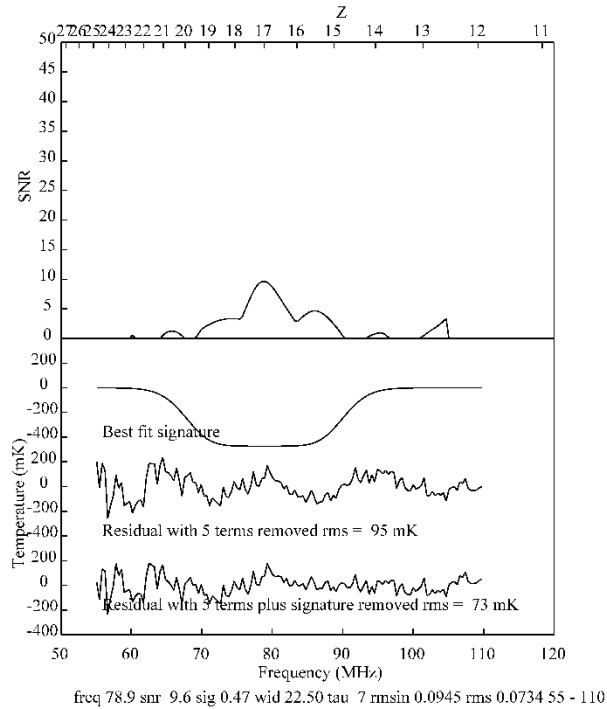


Figure 2. Signature search for midband 2018_146-2018_218 GHA=22-02 hours “Galaxy Up” data.

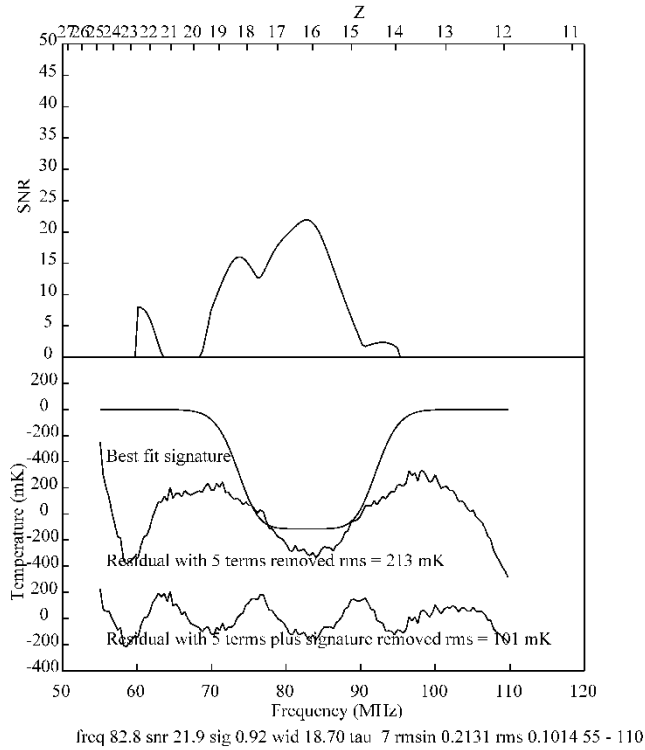


Figure 3. GHA 02-06 hours.

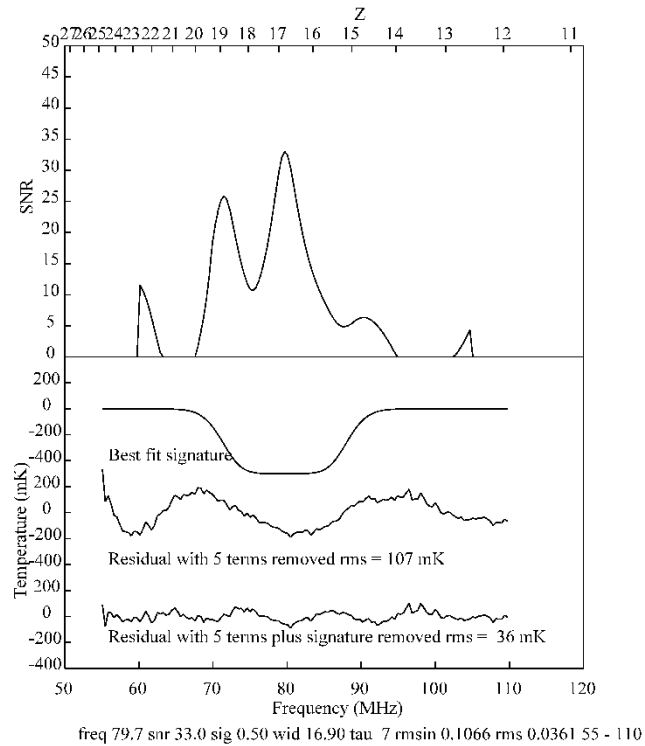


Figure 4. GHA 06-10 hours.

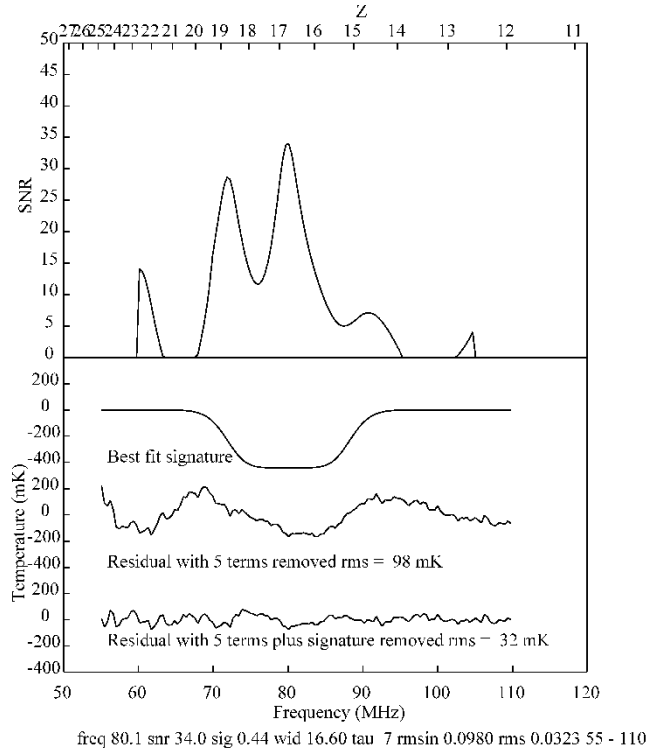


Figure 5. GHA 10-14 hours.

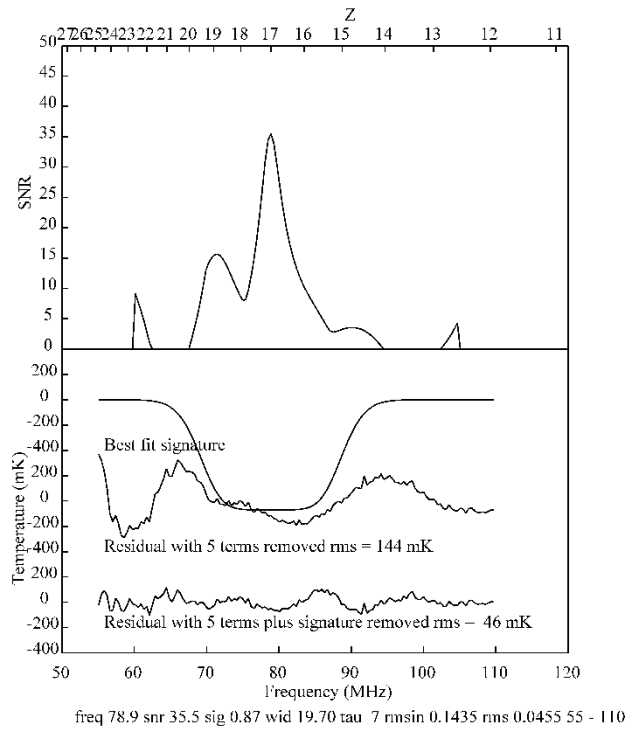
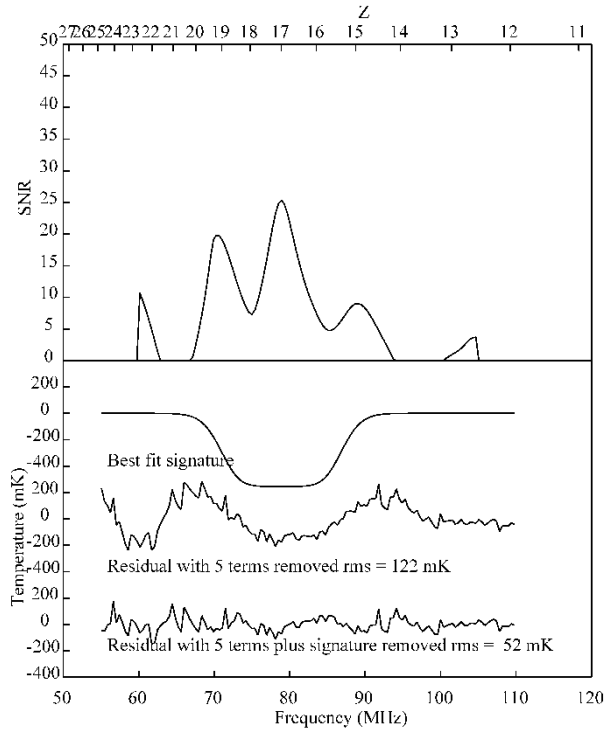


Figure 6. GHA 14-18 hours.



freq 78.9 snr 25.3 sig 0.55 wid 16.10 tau 7 rmsin 0.1218 rms 0.0517 55 - 110

Figure 7. GHA 18-22 hours.