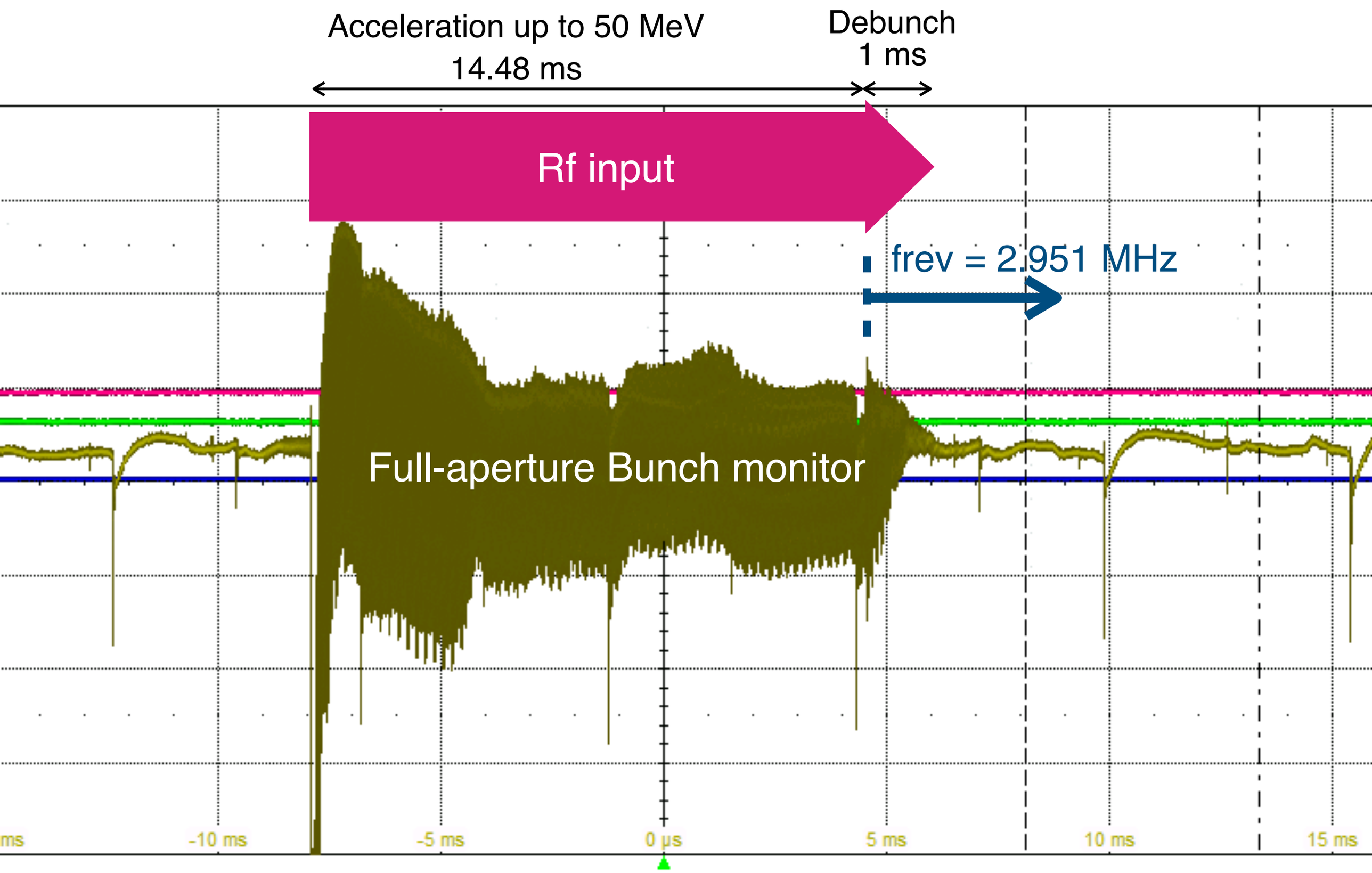
Observation of Schottky signal

2022. 11. 18 Tom Uesugi



RBW: 20kHz

Marker: 26.593 75MHz
-91.844dBm (-134.854dBm/Hz)

h = 9 (frev = 2.951 MHz)

0.5 MHz/div

-9
dBm

10
dB
/div

-109
dBm

Center: 26.4MHz

Span: 5MHz

Marker: 26.593 75MHz
-107.115dBm
-13.44ms -84frame

-125
frame
-9
dBm

-109
dBm
-44

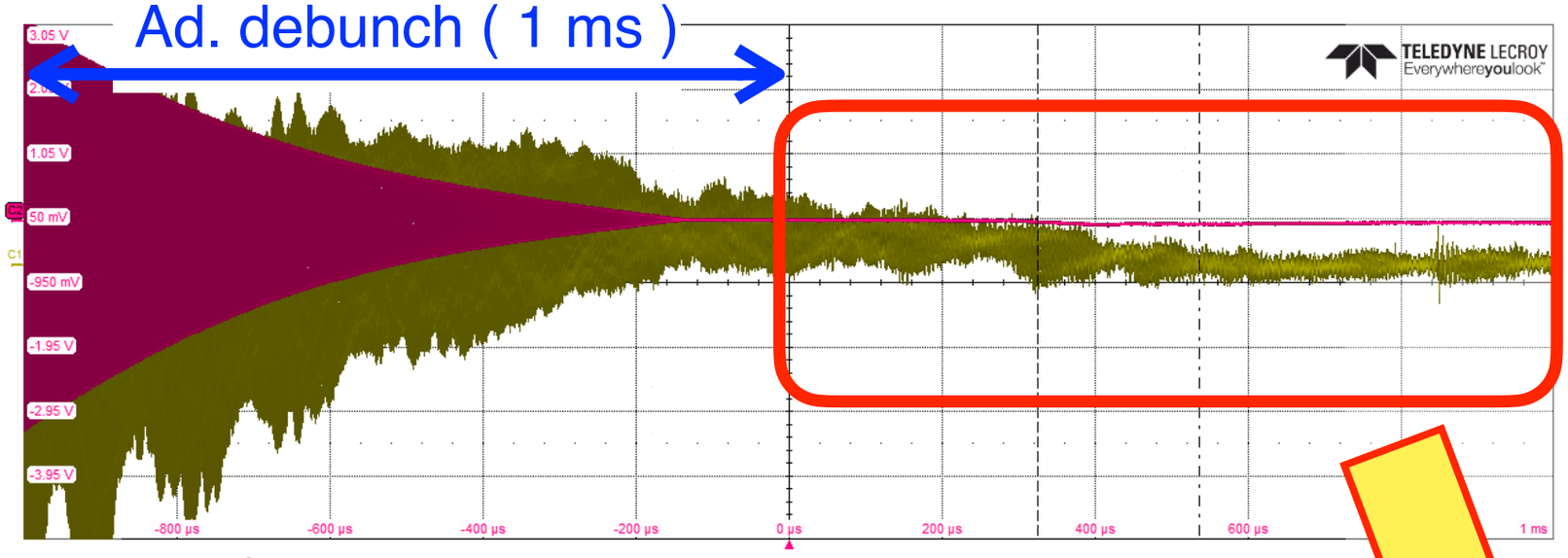
1 ms

0.15 MHz

$$\frac{0.15\ MHz}{2.951 MHz} = 0.051$$

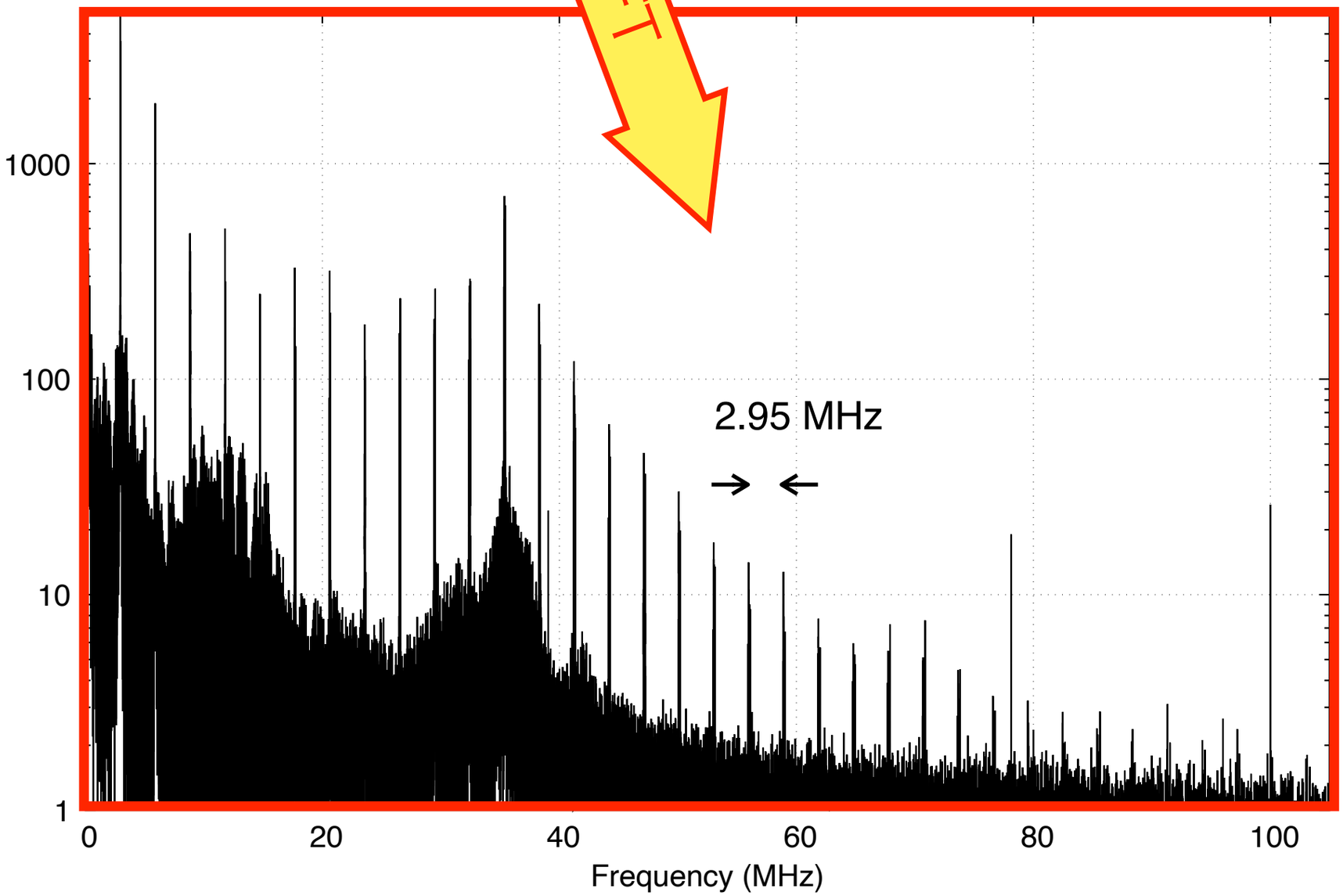
スタート

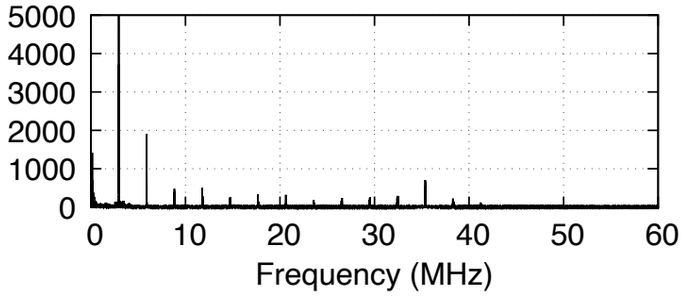
RSA230

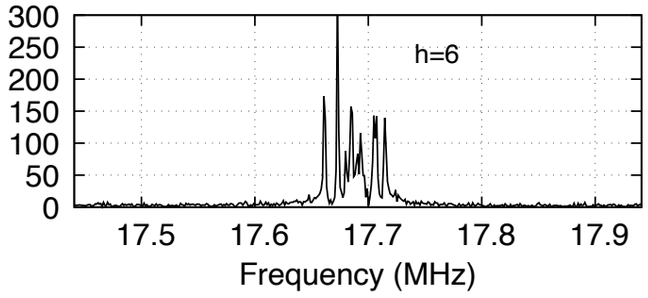


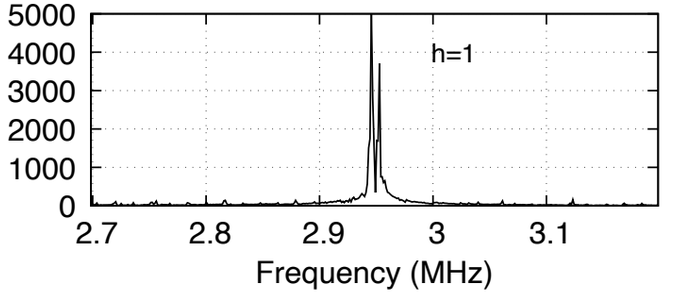
0.4 ns/pts x 5,000,002 pts

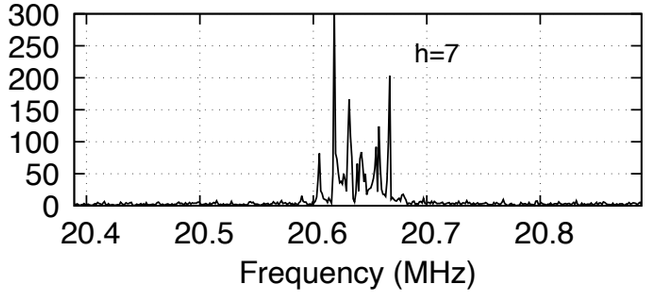
FFT

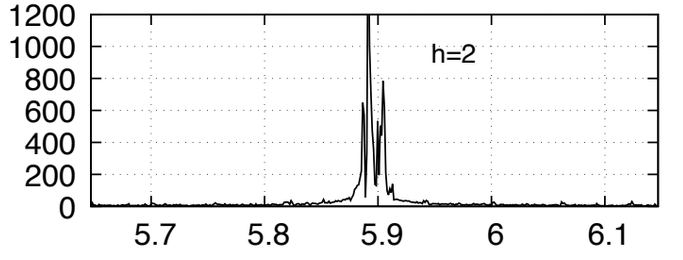


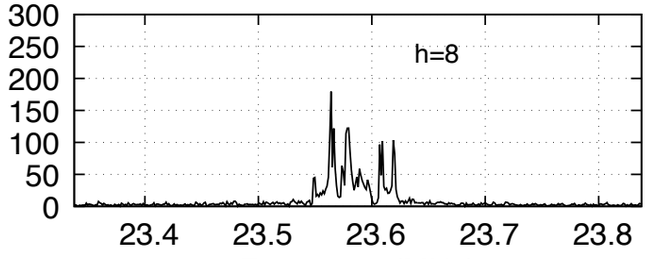

5000
4000
3000
2000
1000
0
0
10
20
30
40
50
60
Frequency (MHz)

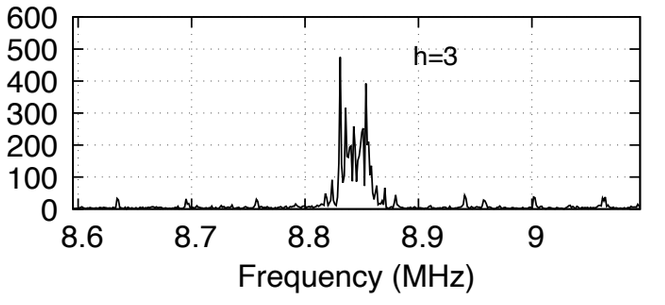

300
250
200
150
100
50
0
h=6
17.5
17.6
17.7
17.8
17.9
Frequency (MHz)

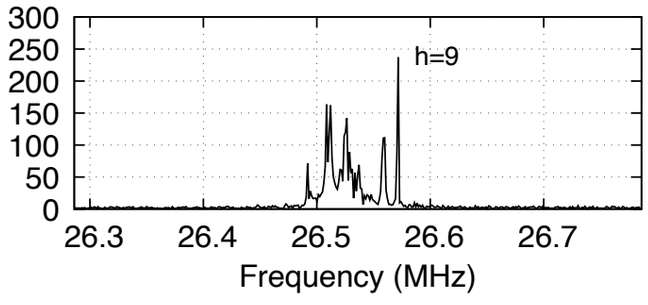

5000
4000
3000
2000
1000
0
h=1
2.7
2.8
2.9
3
3.1
Frequency (MHz)

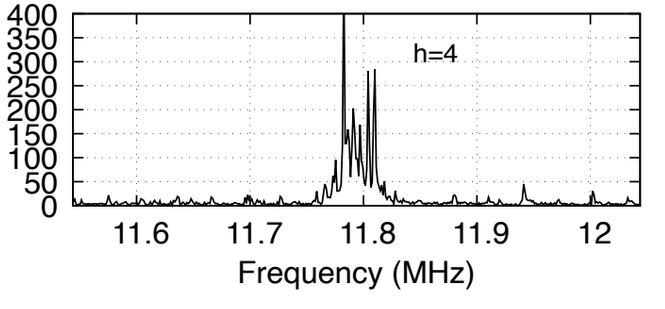

300
250
200
150
100
50
0
h=7
20.4
20.5
20.6
20.7
20.8
Frequency (MHz)

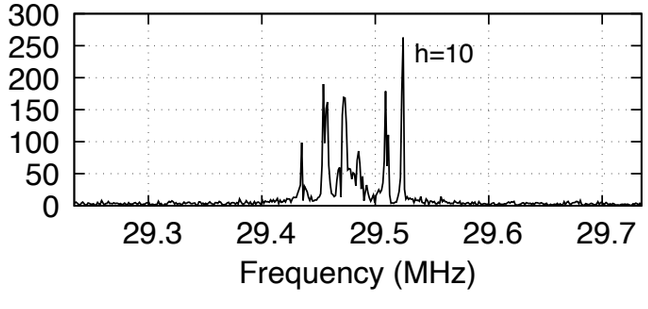

1200
1000
800
600
400
200
0
h=2
5.7
5.8
5.9
6
6.1
Frequency (MHz)

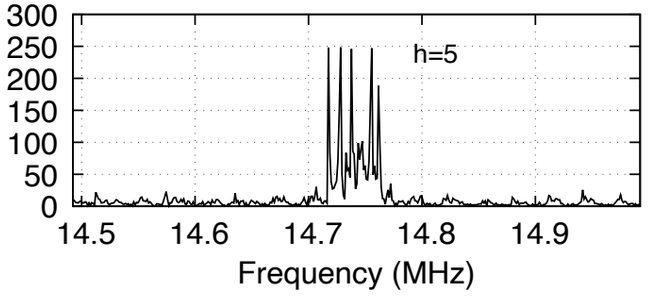

300
250
200
150
100
50
0
h=8
23.4
23.5
23.6
23.7
23.8
Frequency (MHz)

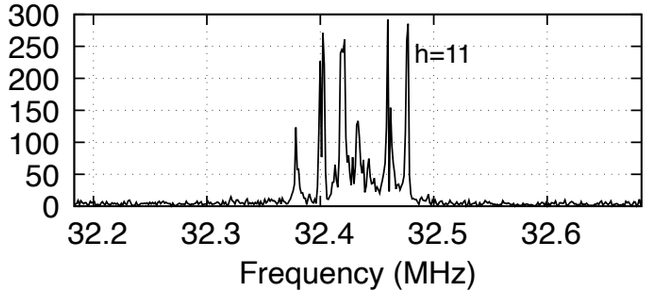

600
500
400
300
200
100
0
h=3
8.6
8.7
8.8
8.9
9
Frequency (MHz)

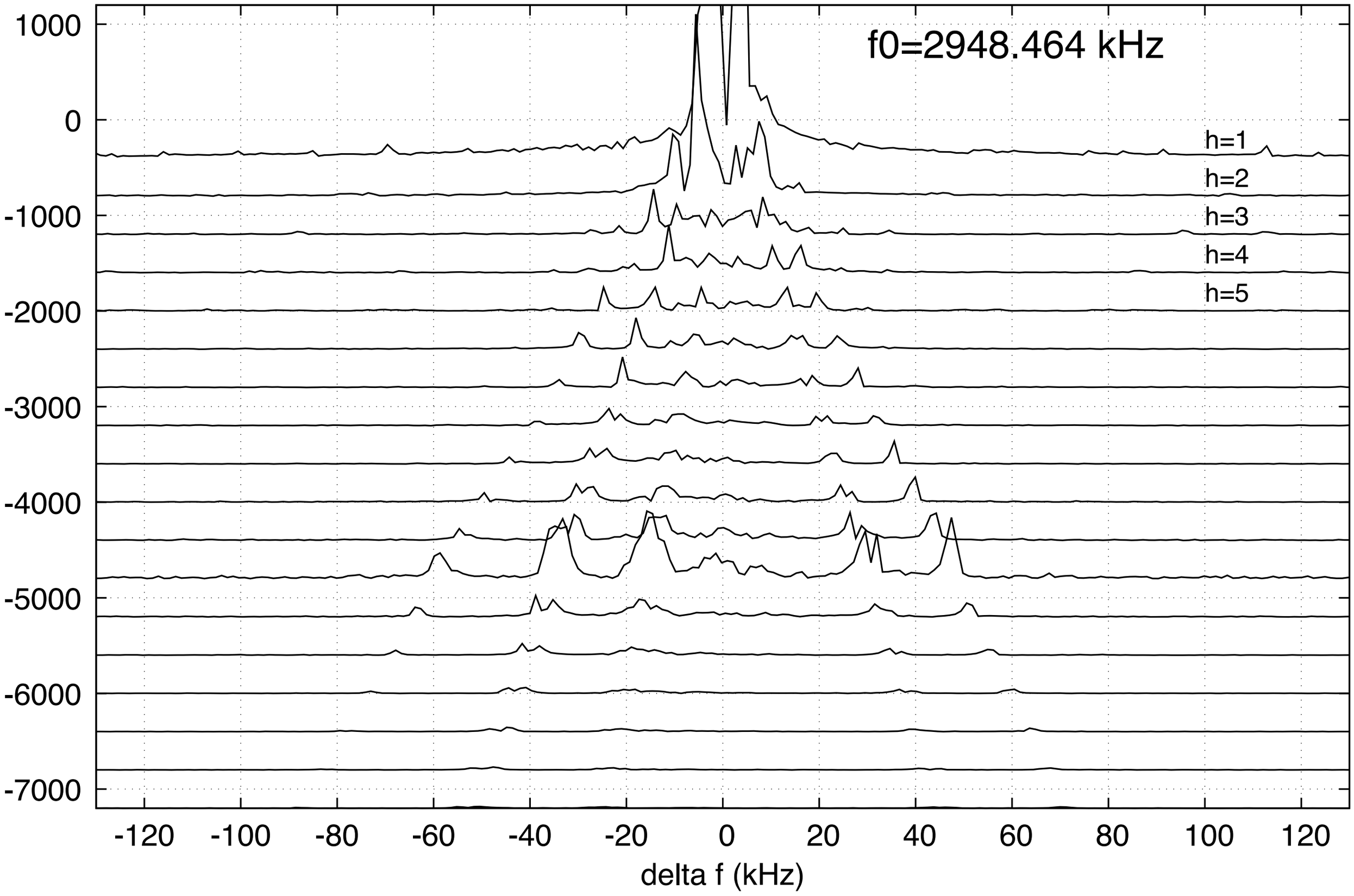

300
250
200
150
100
50
0
h=9
26.3
26.4
26.5
26.6
26.7
Frequency (MHz)


400
350
300
250
200
150
100
50
0
h=4
11.6
11.7
11.8
11.9
12
Frequency (MHz)


300
250
200
150
100
50
0
h=10
29.3
29.4
29.5
29.6
29.7
Frequency (MHz)


300
250
200
150
100
50
0
h=5
14.5
14.6
14.7
14.8
14.9
Frequency (MHz)


300
250
200
150
100
50
0
h=11
32.2
32.3
32.4
32.5
32.6
Frequency (MHz)


f0=2948.464 kHz
h=1
h=2
h=3
h=4
h=5
1000
0
-1000
-2000
-3000
-4000
-5000
-6000
-7000
-120
-100
-80
-60
-40
-20
0
20
40
60
80
100
120
delta f (kHz)

$$\frac{dp}{p} = \eta \frac{df}{hf_0} = \frac{1}{2948\ kHz} \frac{df}{h}$$

f0=2948.464 kHz

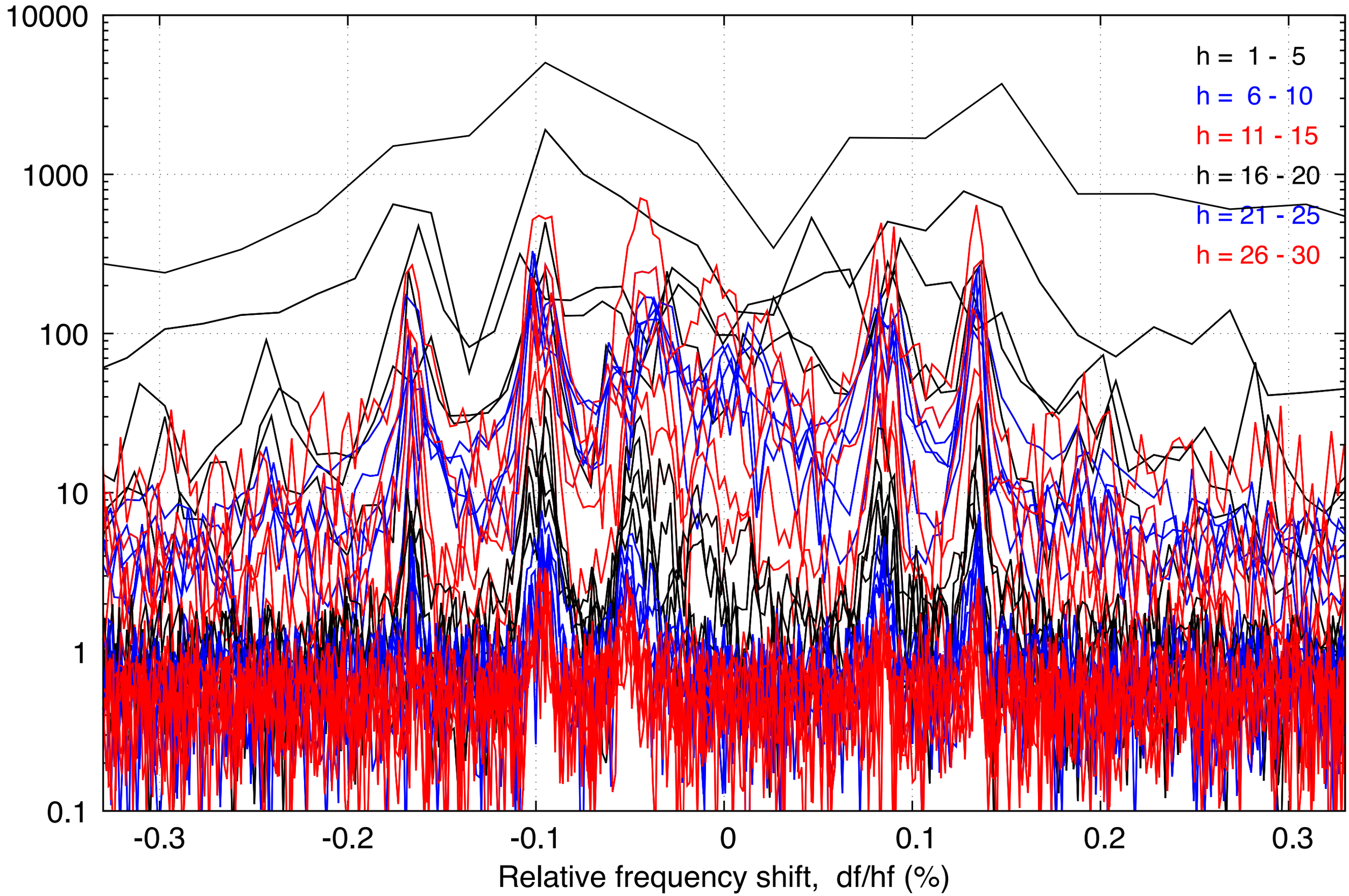
h=1
h=2
h=3
h=4
h=5

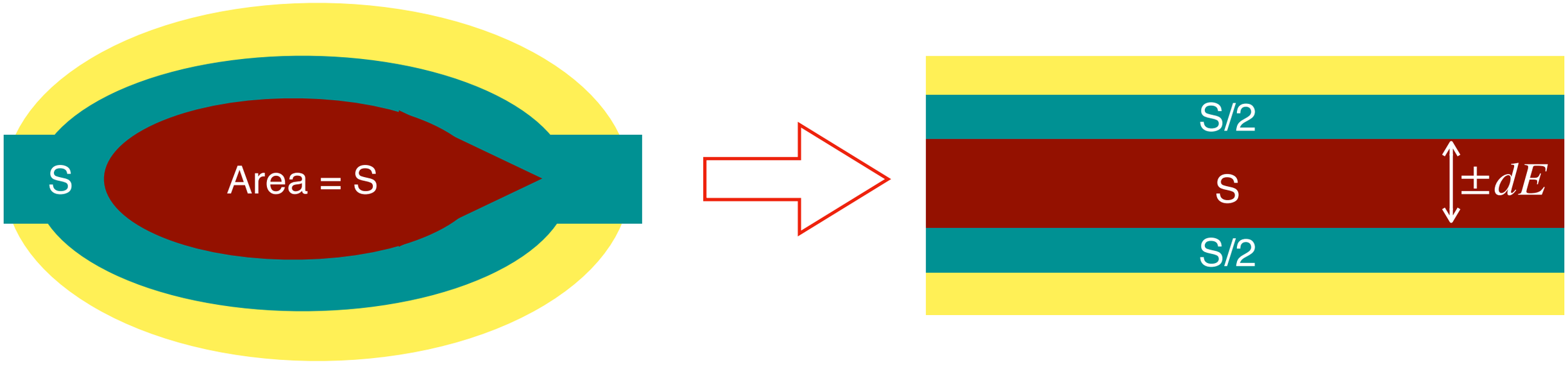
dp=+0.1%
+0.2%
+0.3%

1000
0
-1000
-2000
-3000
-4000
-5000
-6000
-7000

-120 -100 -80 -60 -40 -20 0 20 40 60 80 100 120

delta f (kHz)


10000
1000
100
10
1
0.1
h = 1 - 5
h = 6 - 10
h = 11 - 15
h = 16 - 20
h = 21 - 25
h = 26 - 30
-0.3
-0.2
-0.1
0
0.1
0.2
0.3
Relative frequency shift, df/hf (%)



$$S \simeq 2 \times \sqrt{-\frac{\beta^2}{\pi\eta} EeV} \times 4\sqrt{2}\,\frac{1-\sin\phi_s}{1+\sin\phi_s}$$

$$= 2.205 \ \ MeV \cdot rad$$

$$\left(\quad V = 4 \ kV \quad , \quad \phi_s = 20^o \quad \right)$$

$$S = 2 \times 2\pi\, dE$$

$$dE = \pm\ 0.175 \ MeV$$

$$\frac{dp}{p} = 0.175\ \%$$