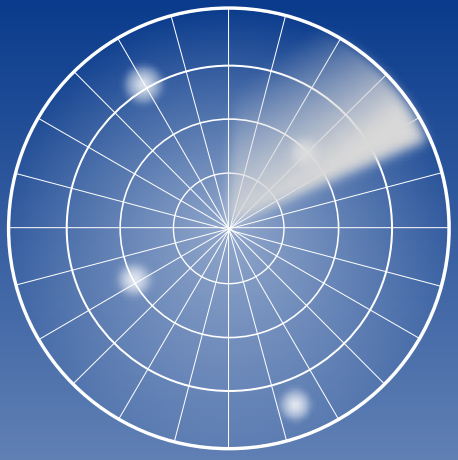
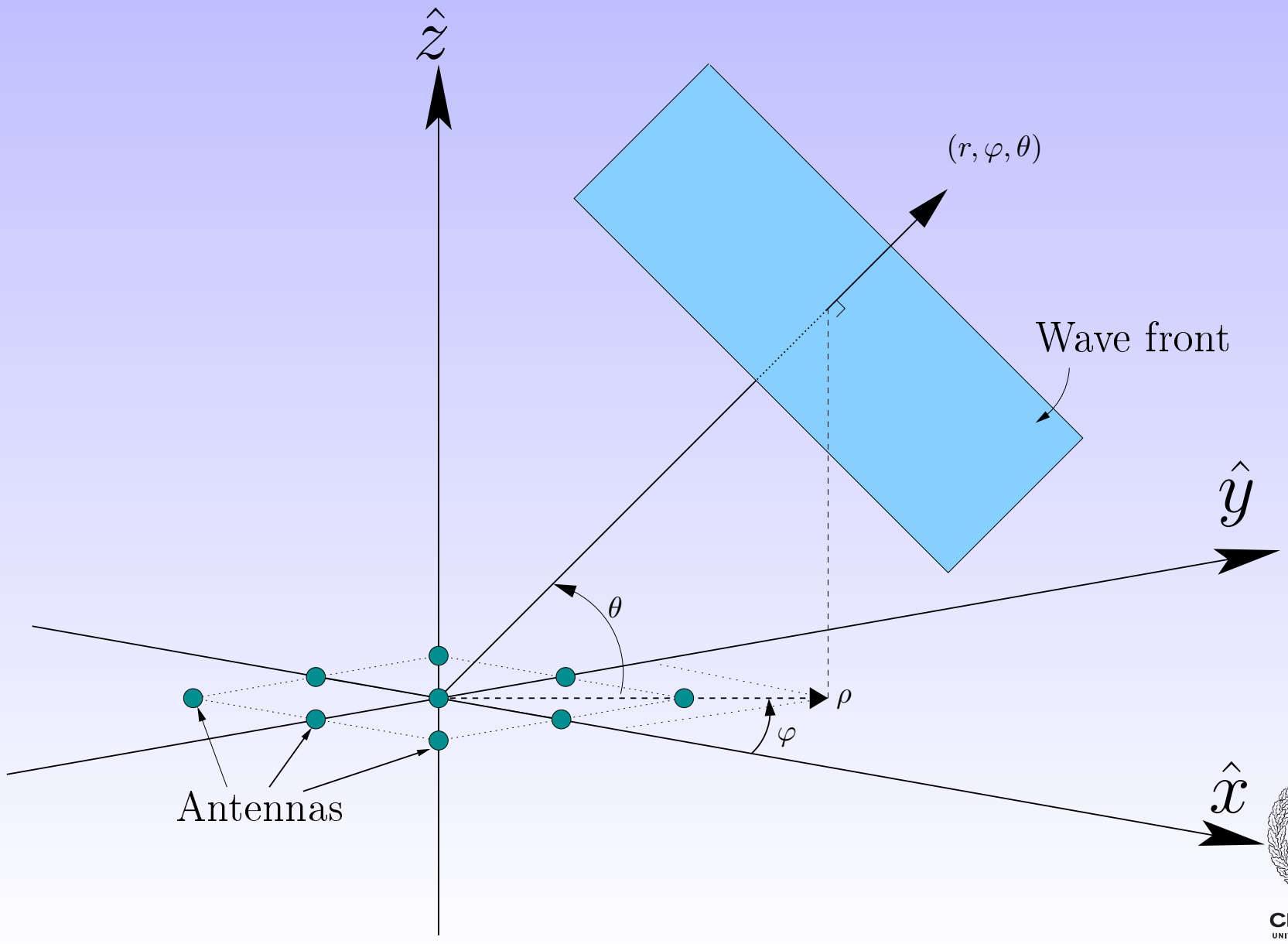


Modelling of Digital Radar

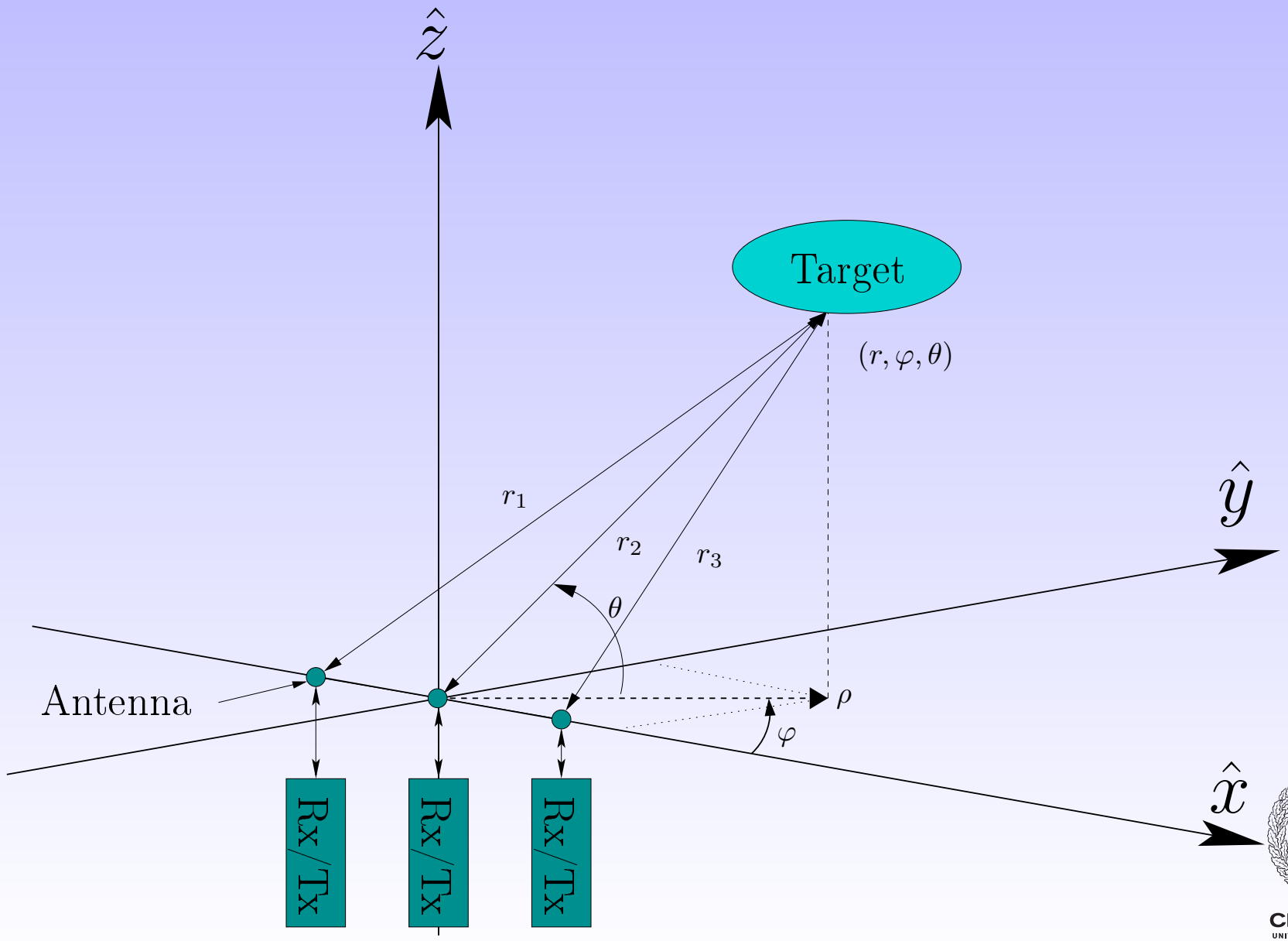
Chalmers University of Technology

Presentation
June 12, 2015

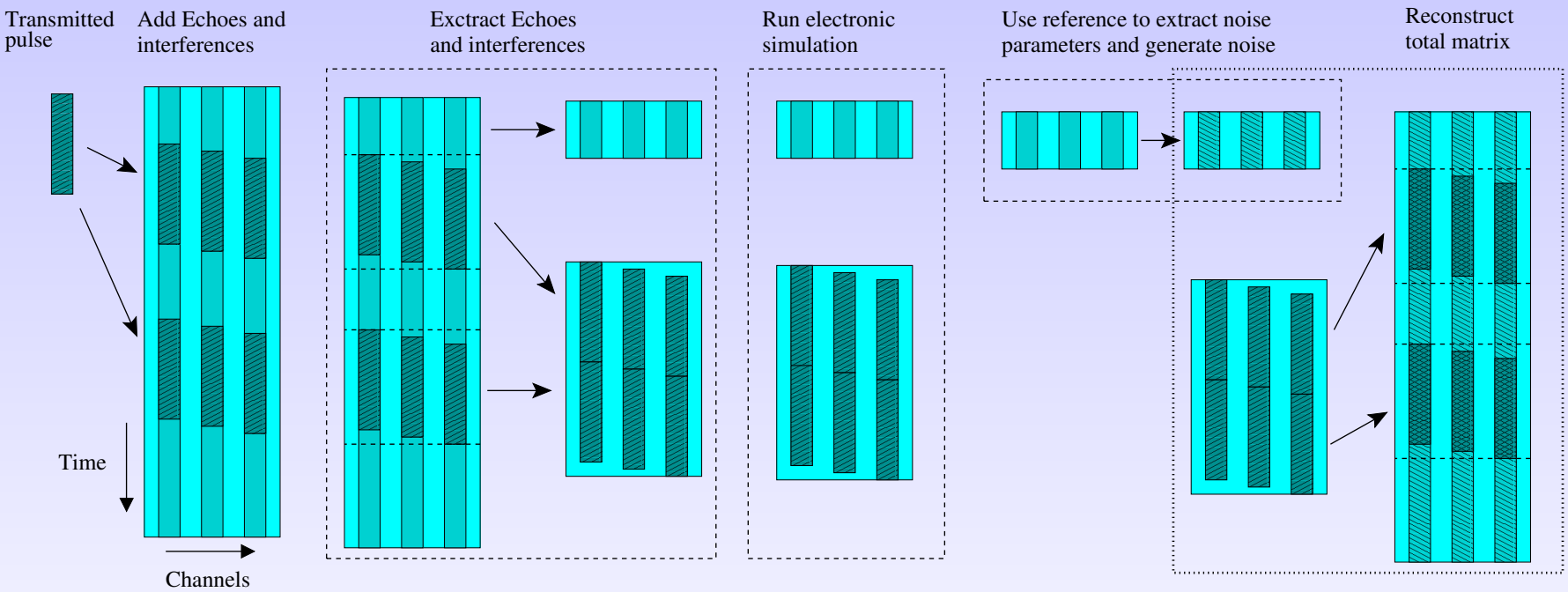
Setup


$\hat{z}$
(r, φ, θ)
Wave front
$\hat{y}$
θ
ρ
φ
Antennas
$\hat{x}$

Setup

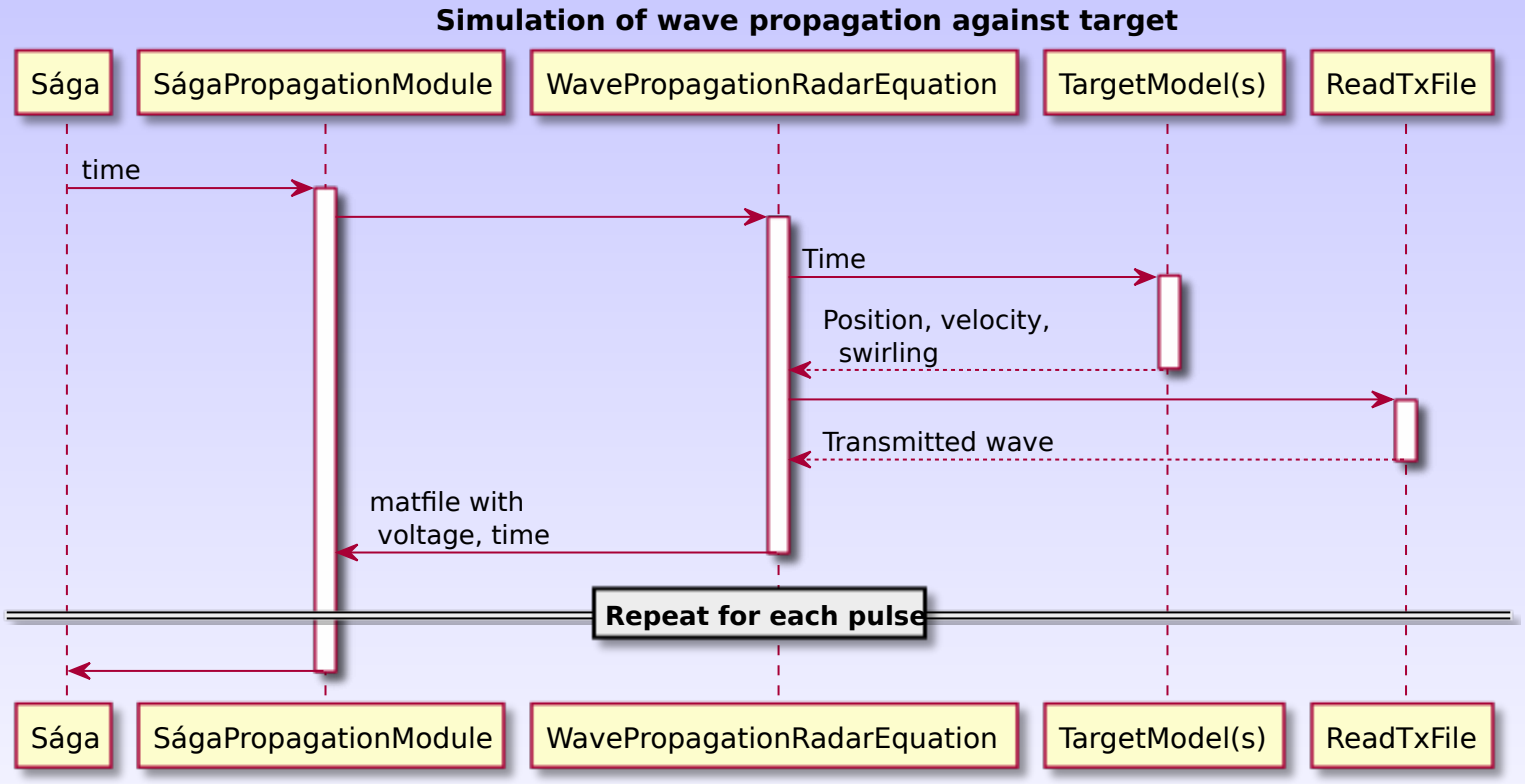

$\hat{z}$
Target
(r, φ, θ)
r_1
r_2
r_3
θ
$\hat{y}$
Antenna
ρ
φ
$\hat{x}$
Rx/Tx
Rx/Tx
Rx/Tx

Data handling



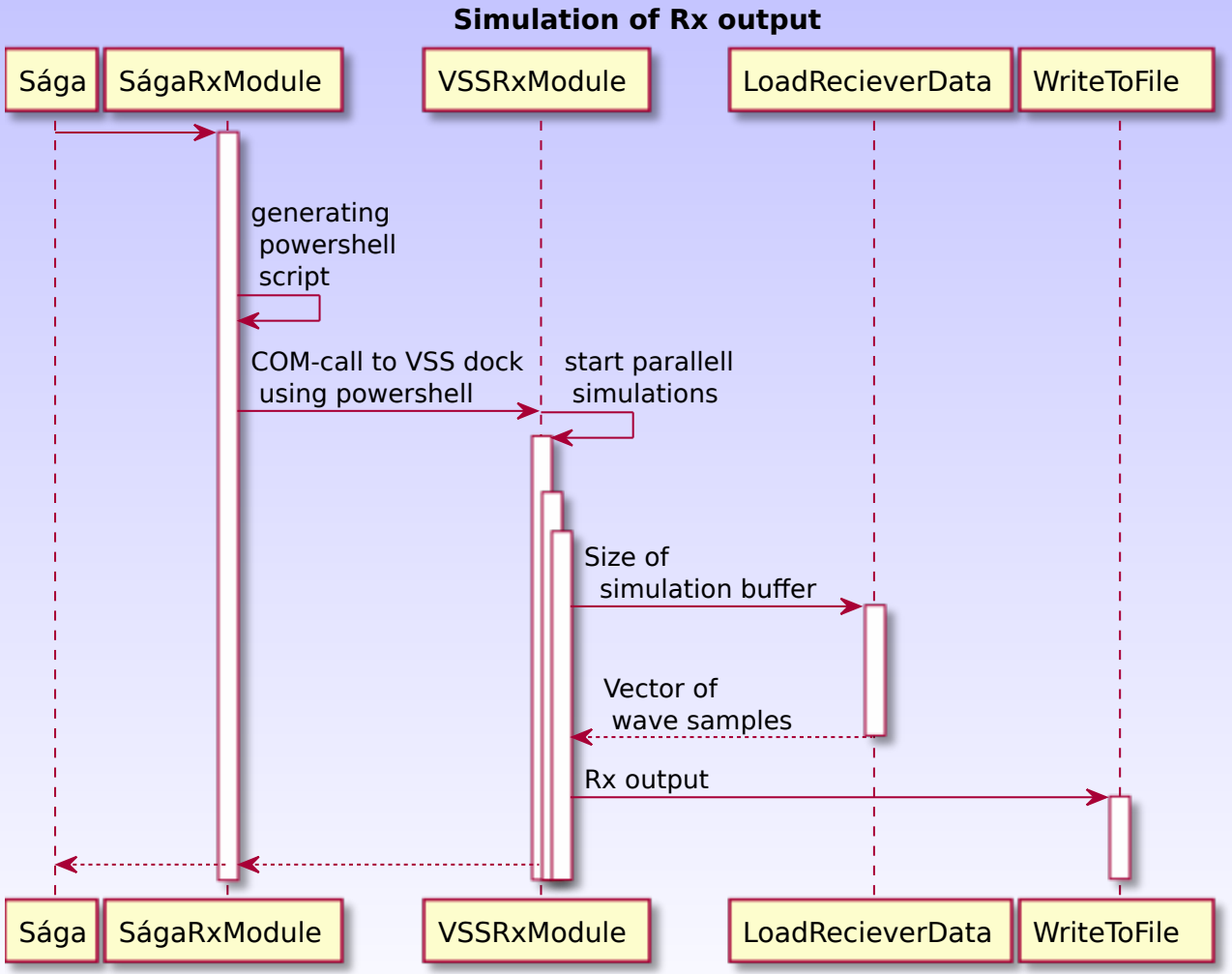
Propagation module

Sequence diagram



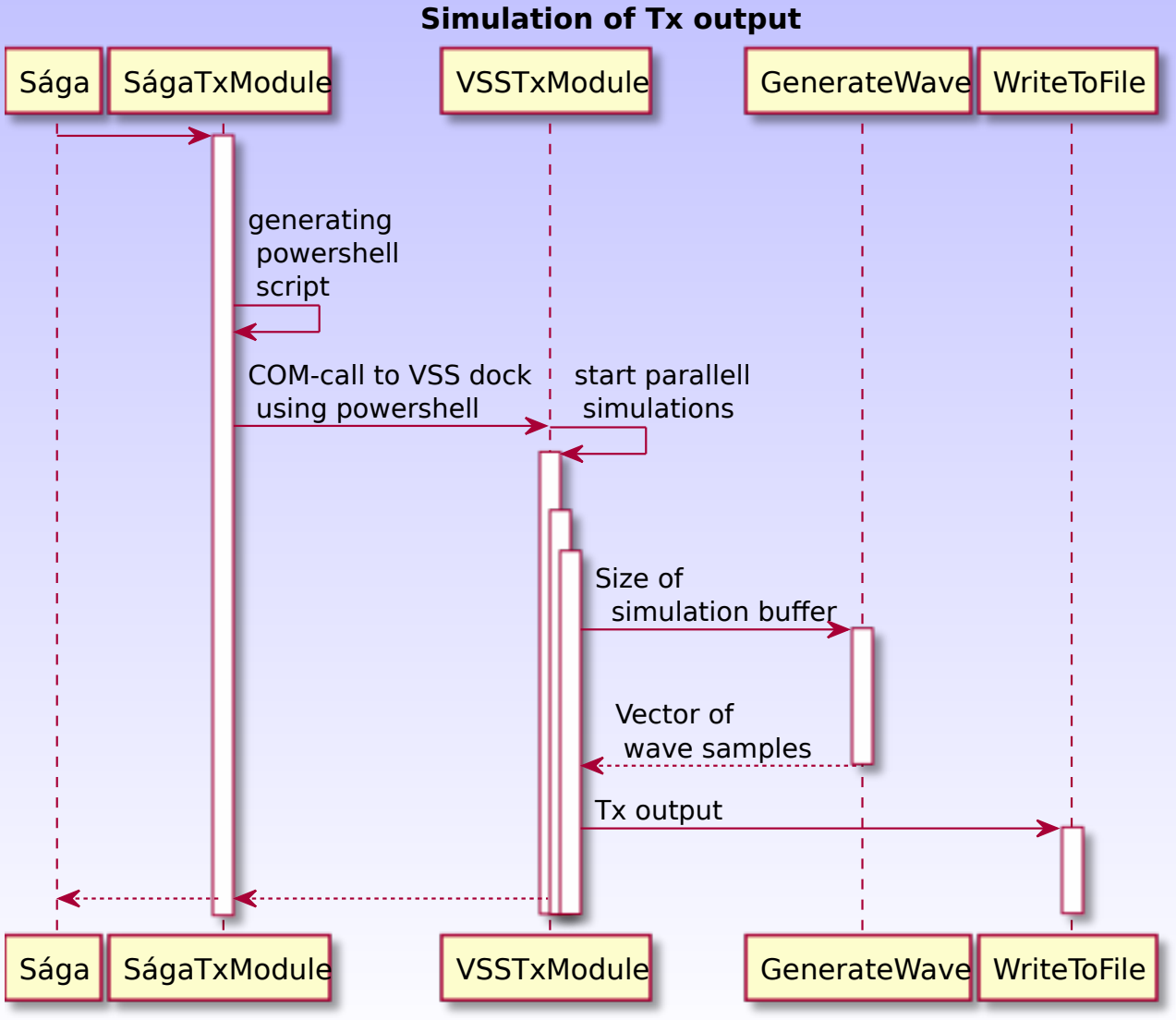
Rx module

Sequence diagram

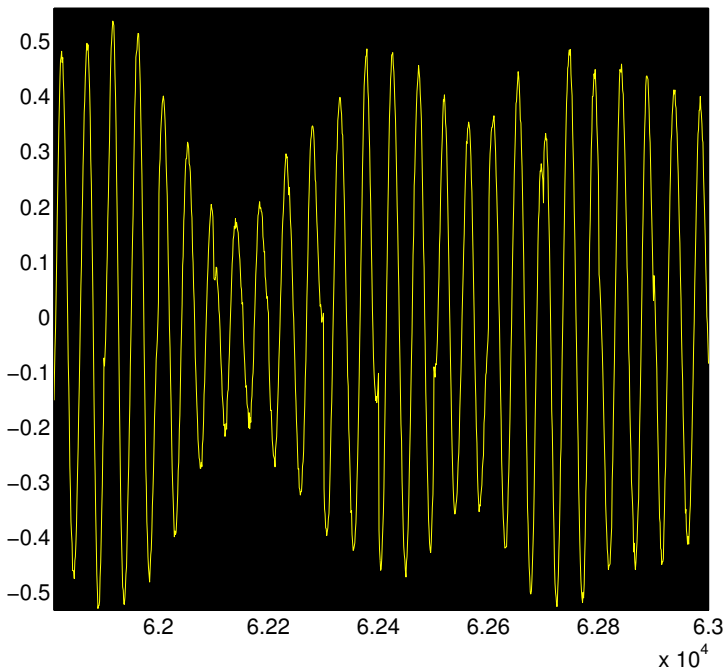


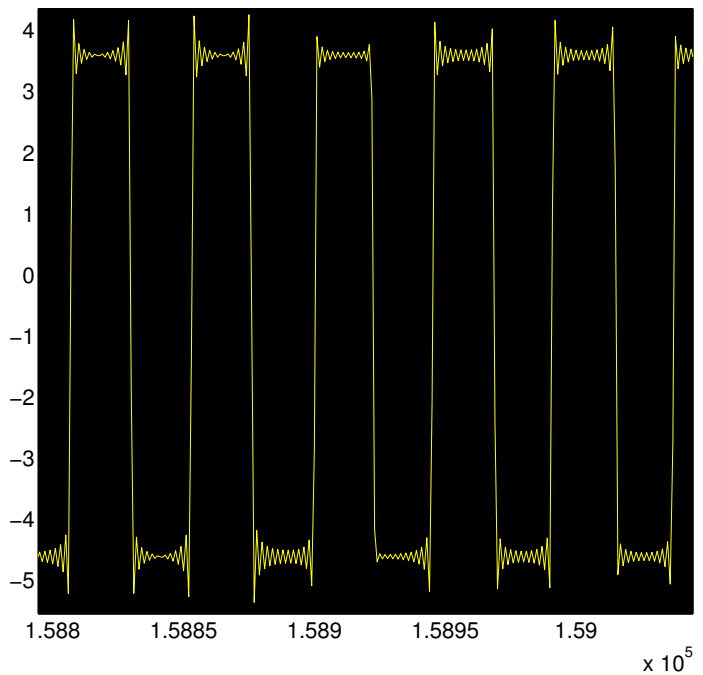
Tx module

Sequence diagram



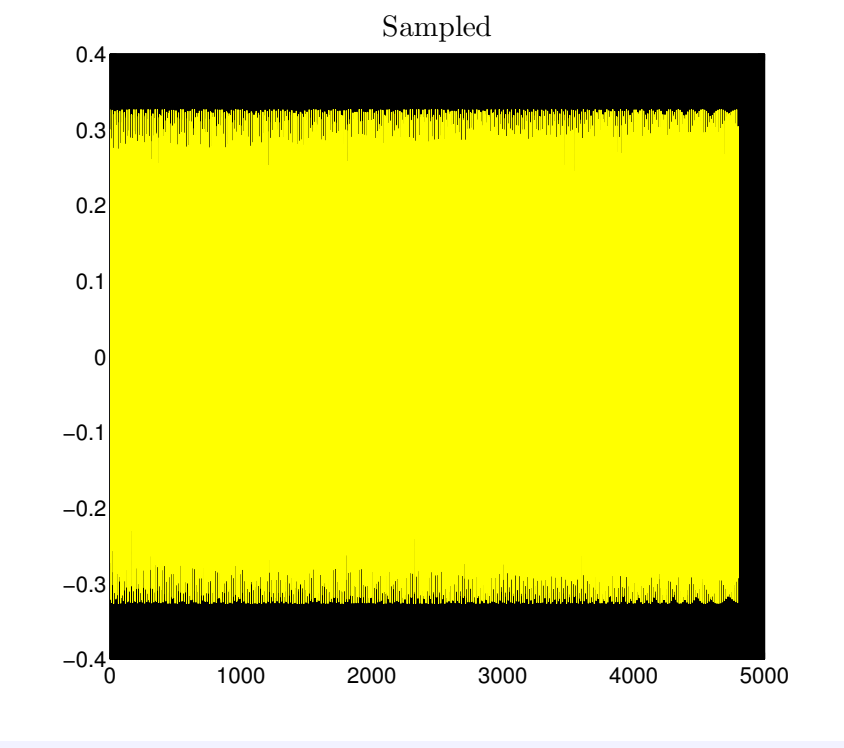
Signal after Rx

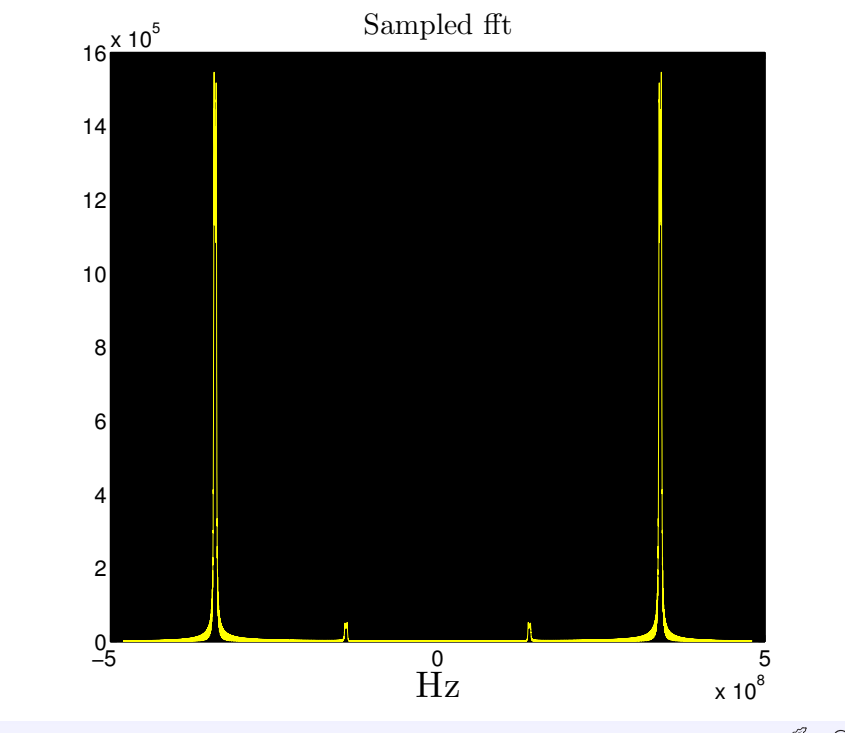




Sampling of signal

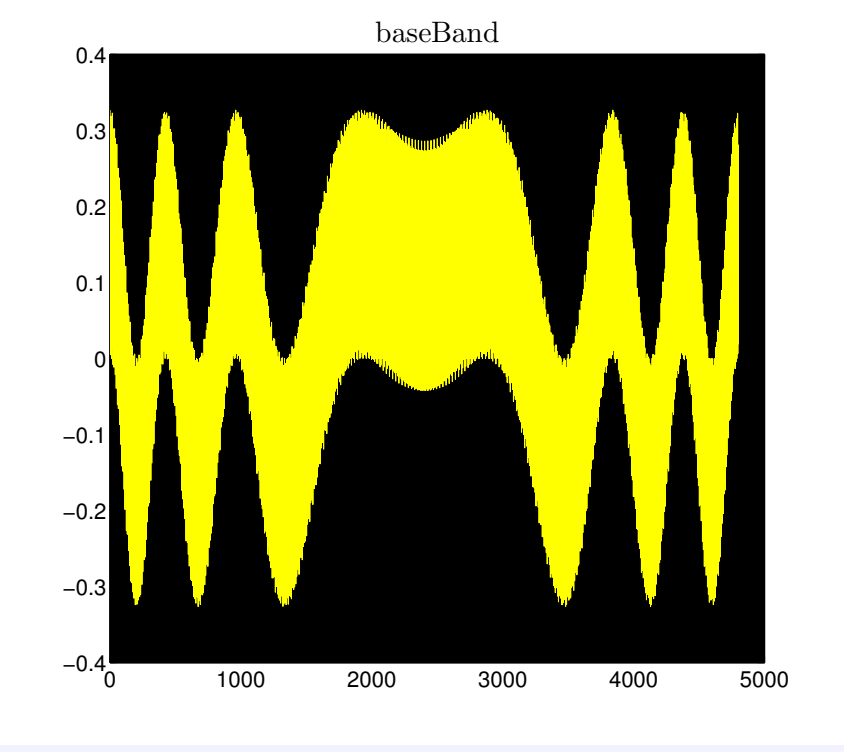
Tx

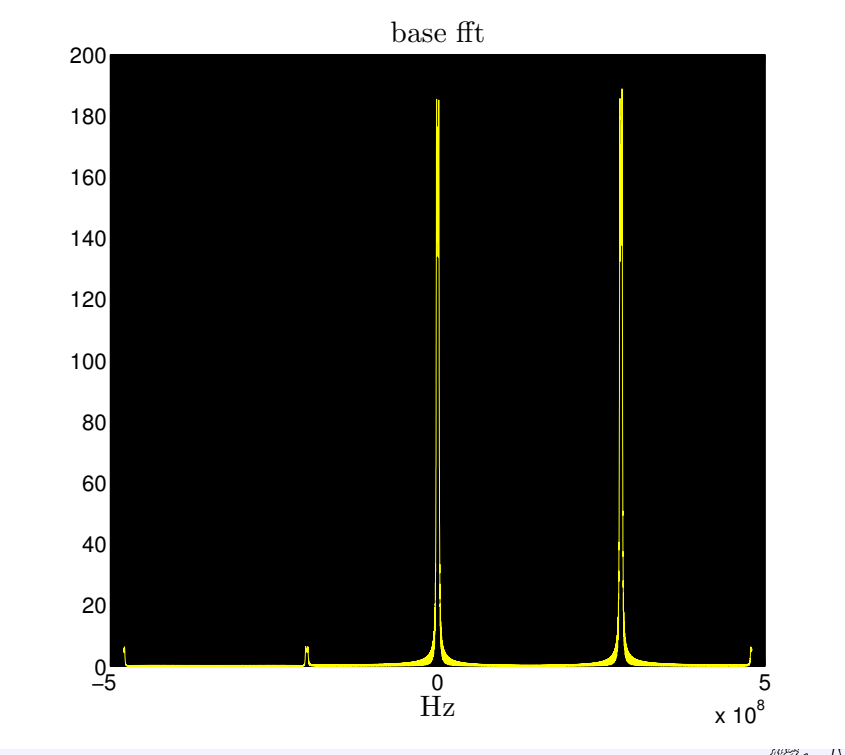




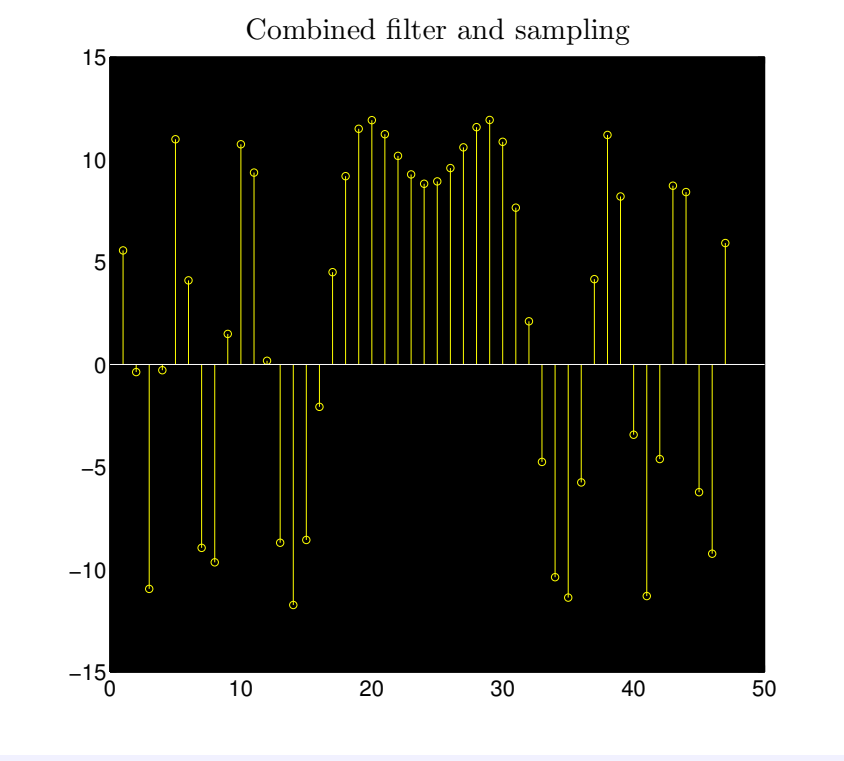
convert to baseband

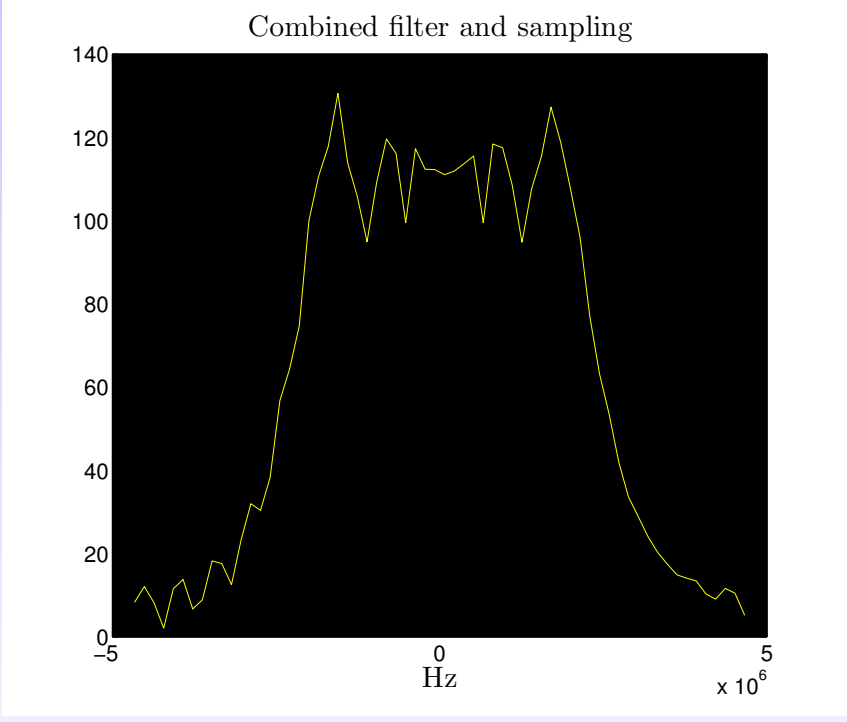
Tx



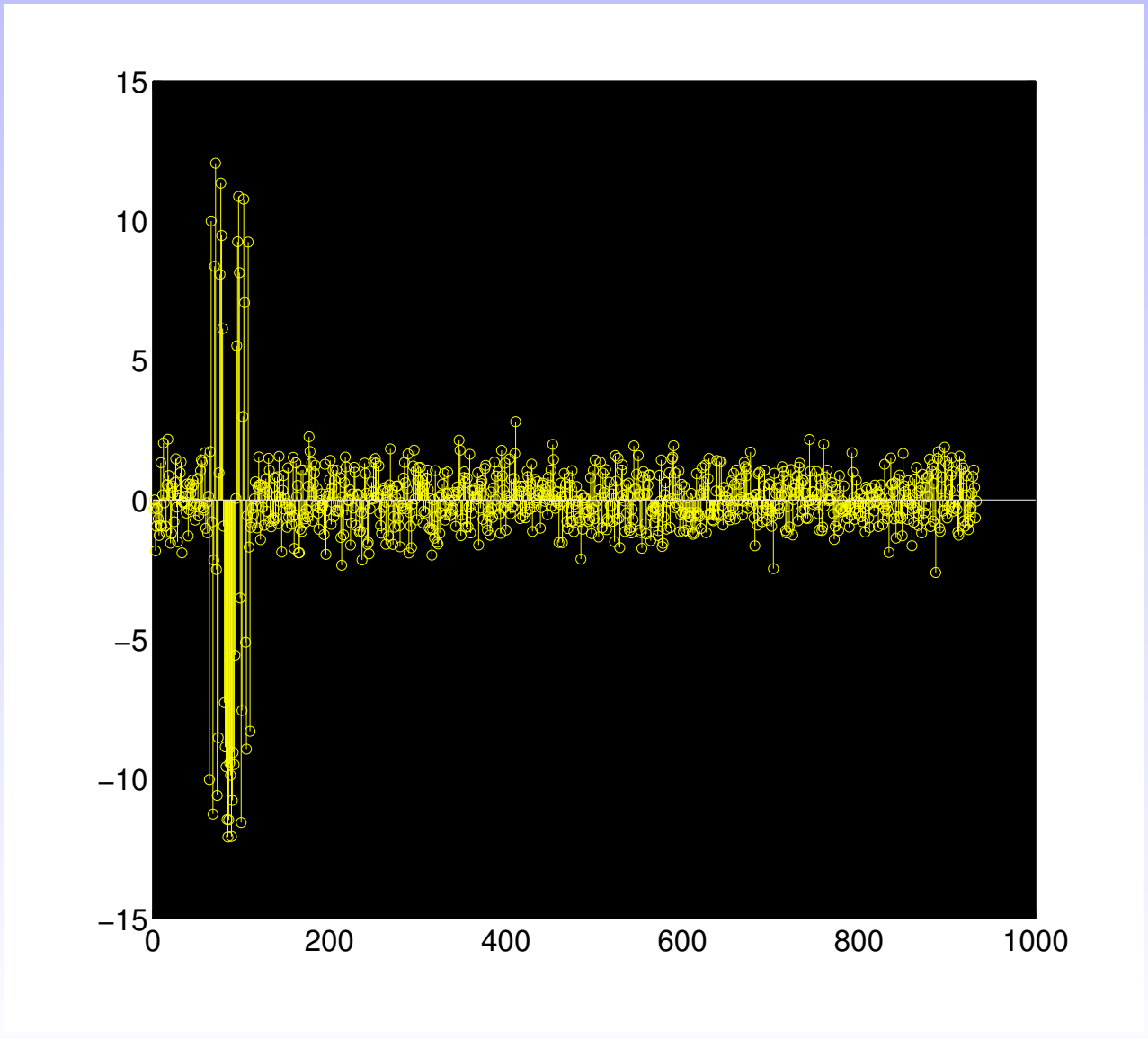


LP filter and rangebinrate ("Fålltakt")

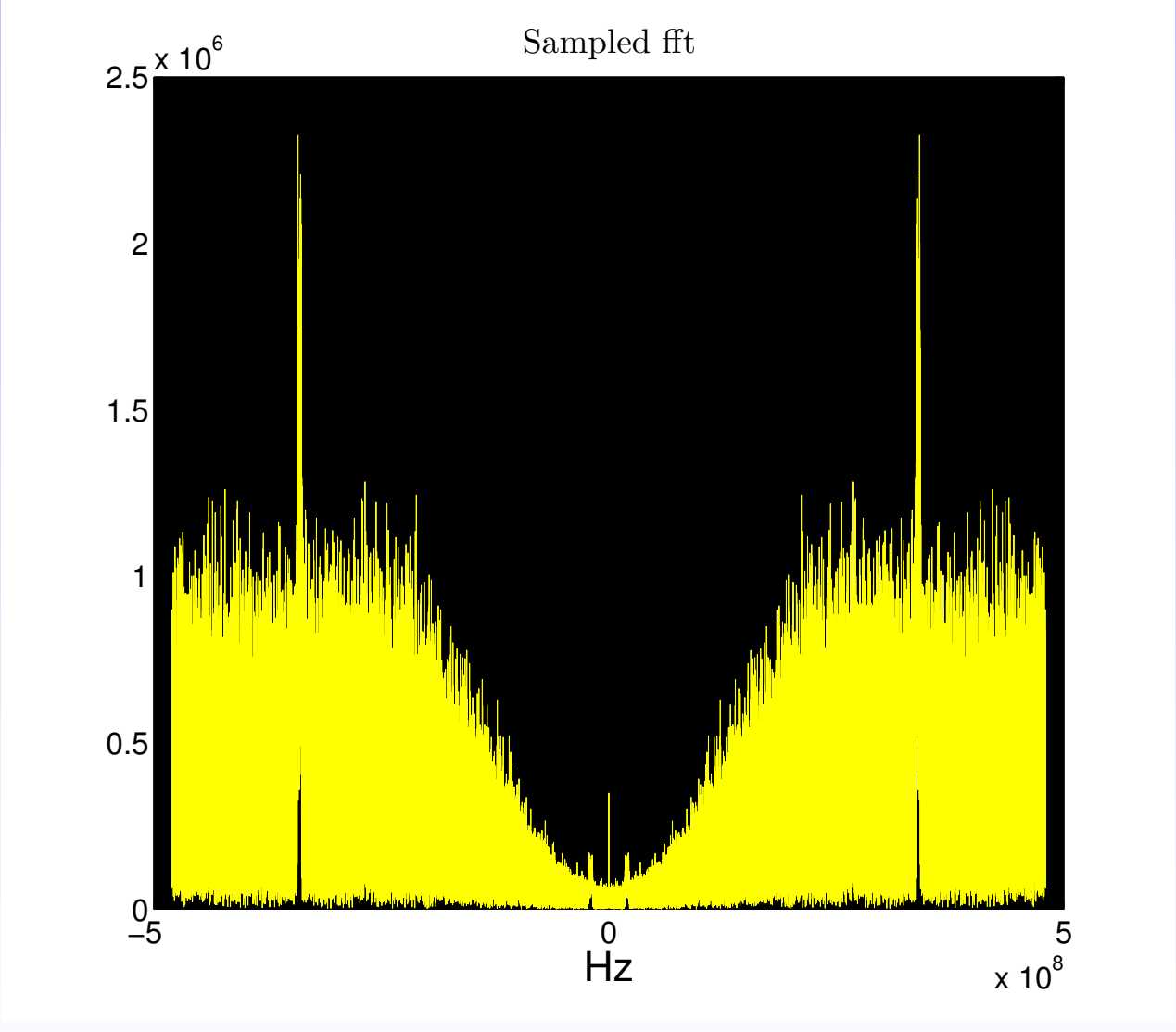




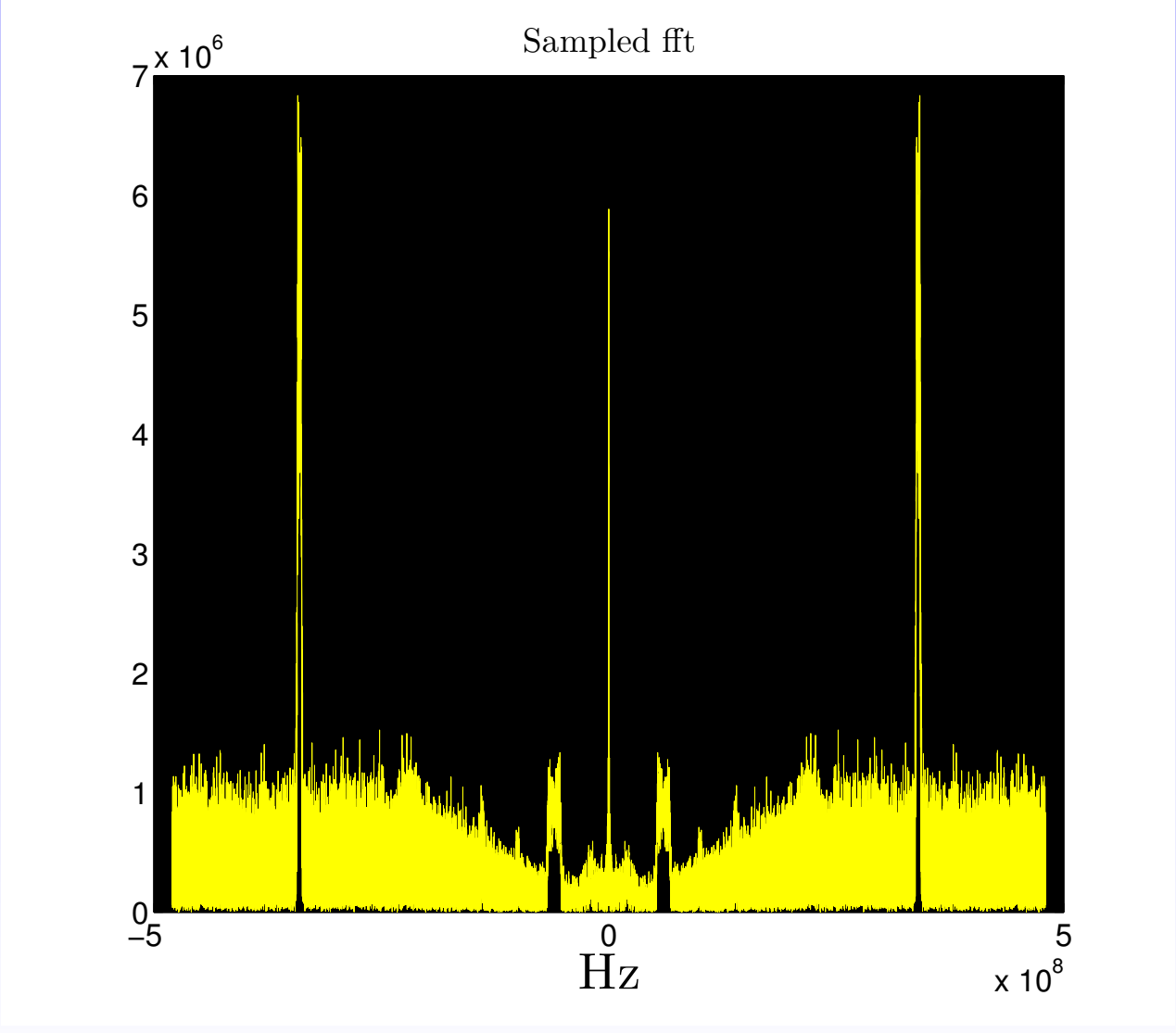
Rescaled



Sampled Rx

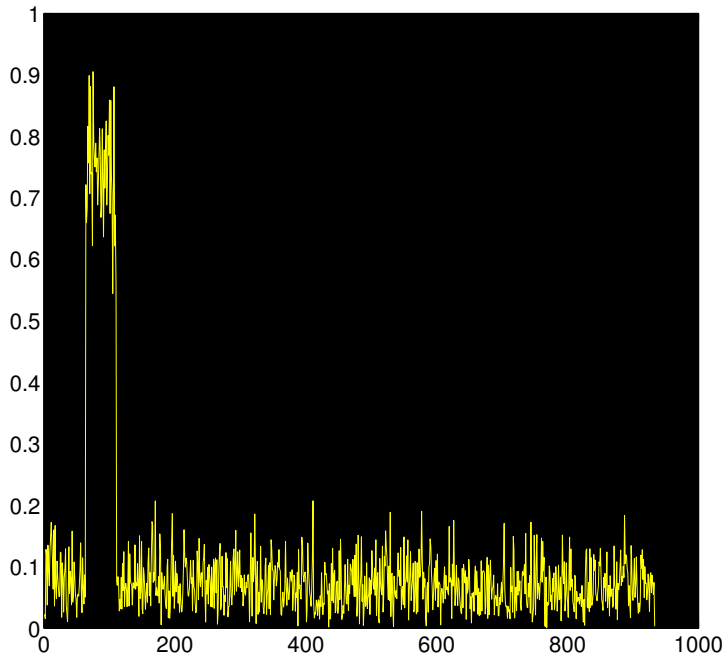


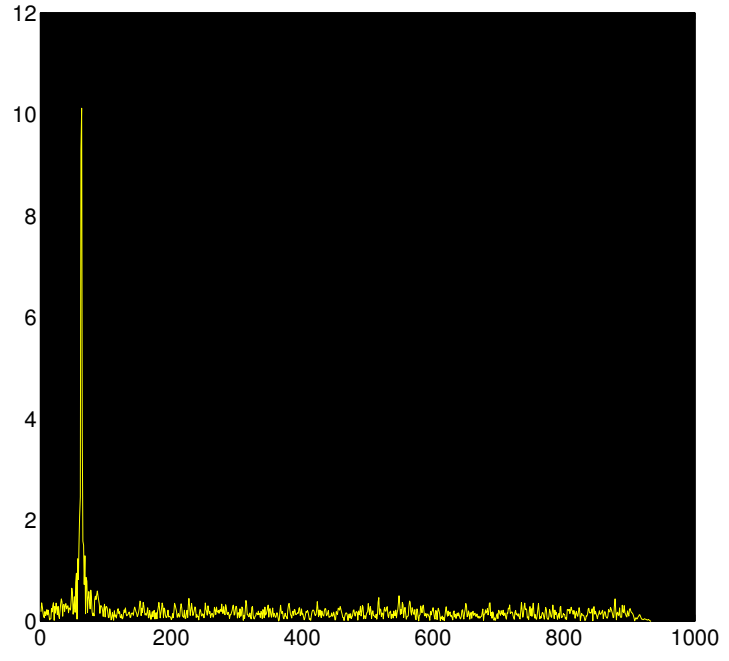
Sampled Rx high power input, cutoff



Correlation of signal

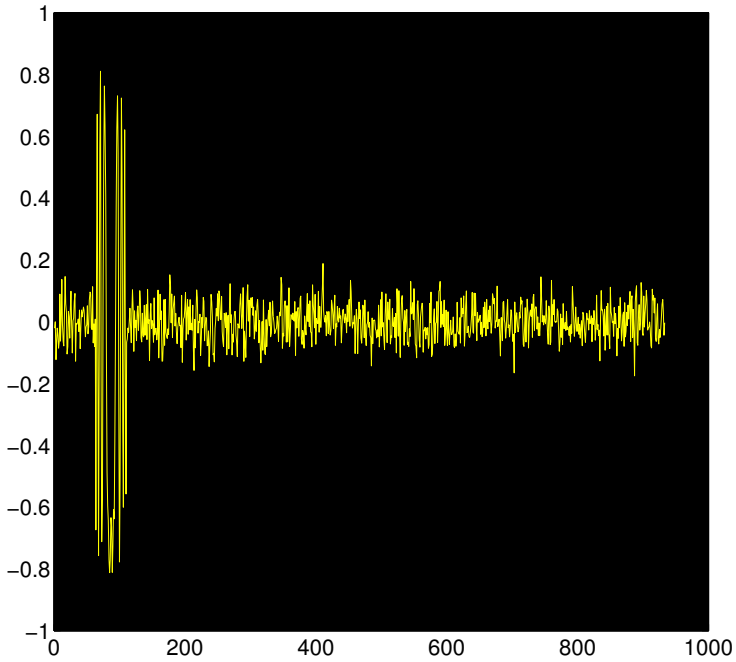
Abs

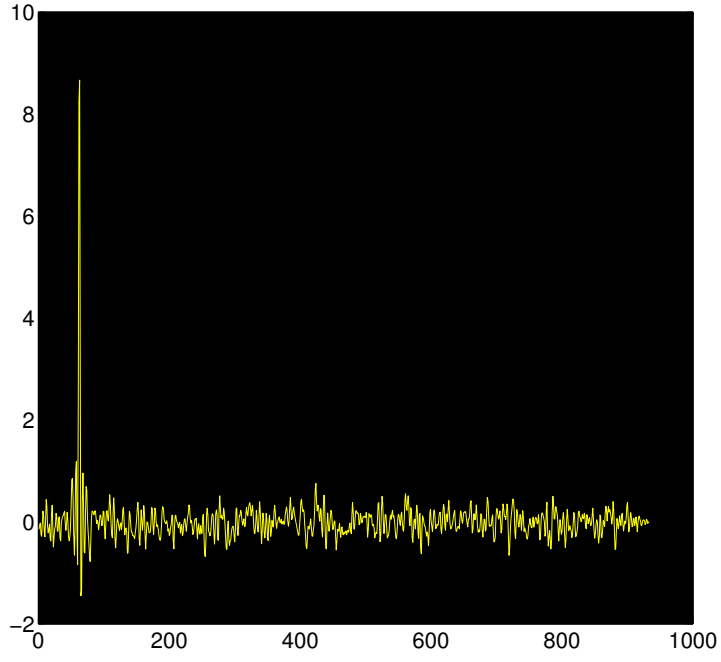




Correlation of signal

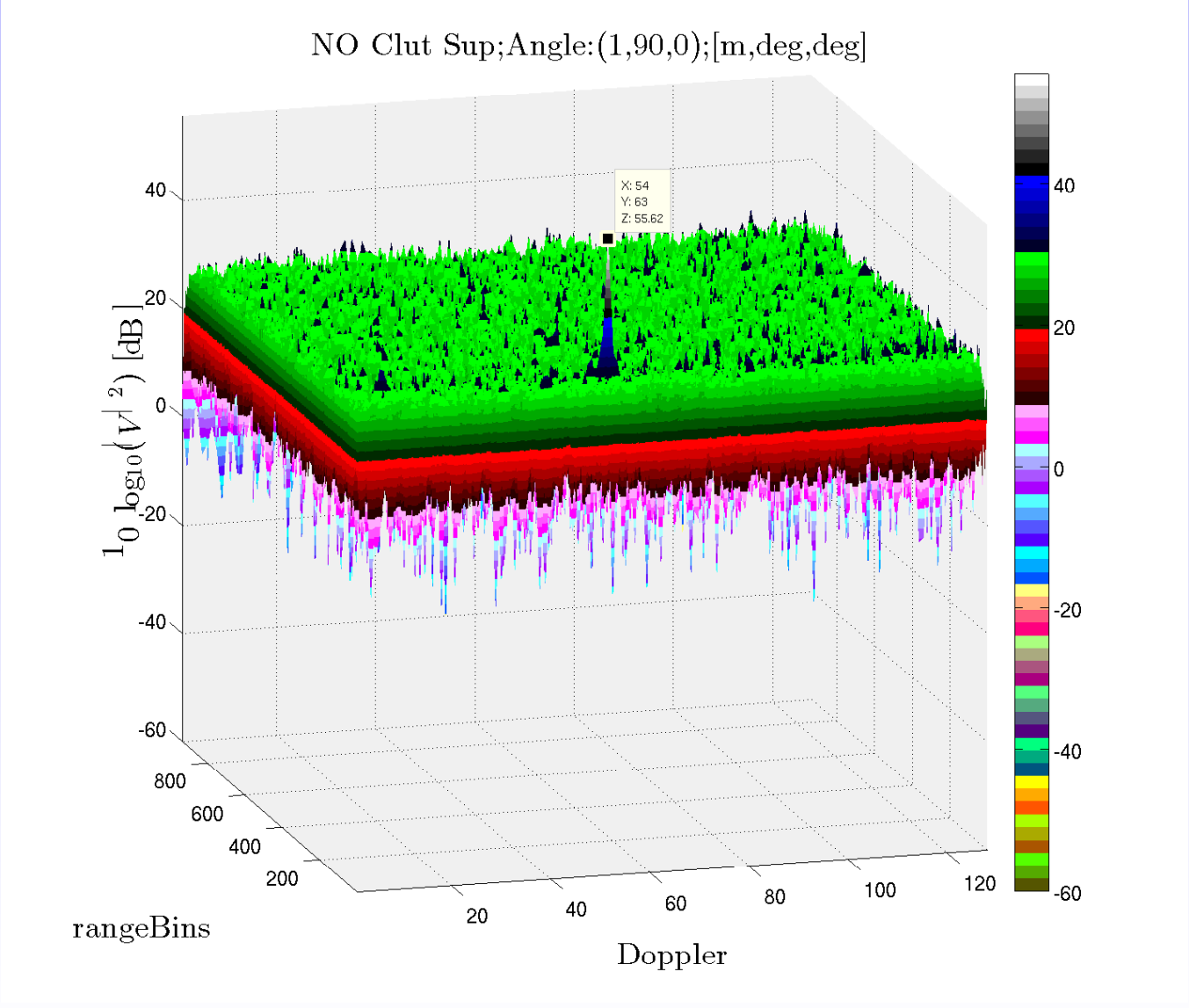
Real





Doppler plot

$\sigma = 1\text{m}^2$, 100m/s, 128 pulse



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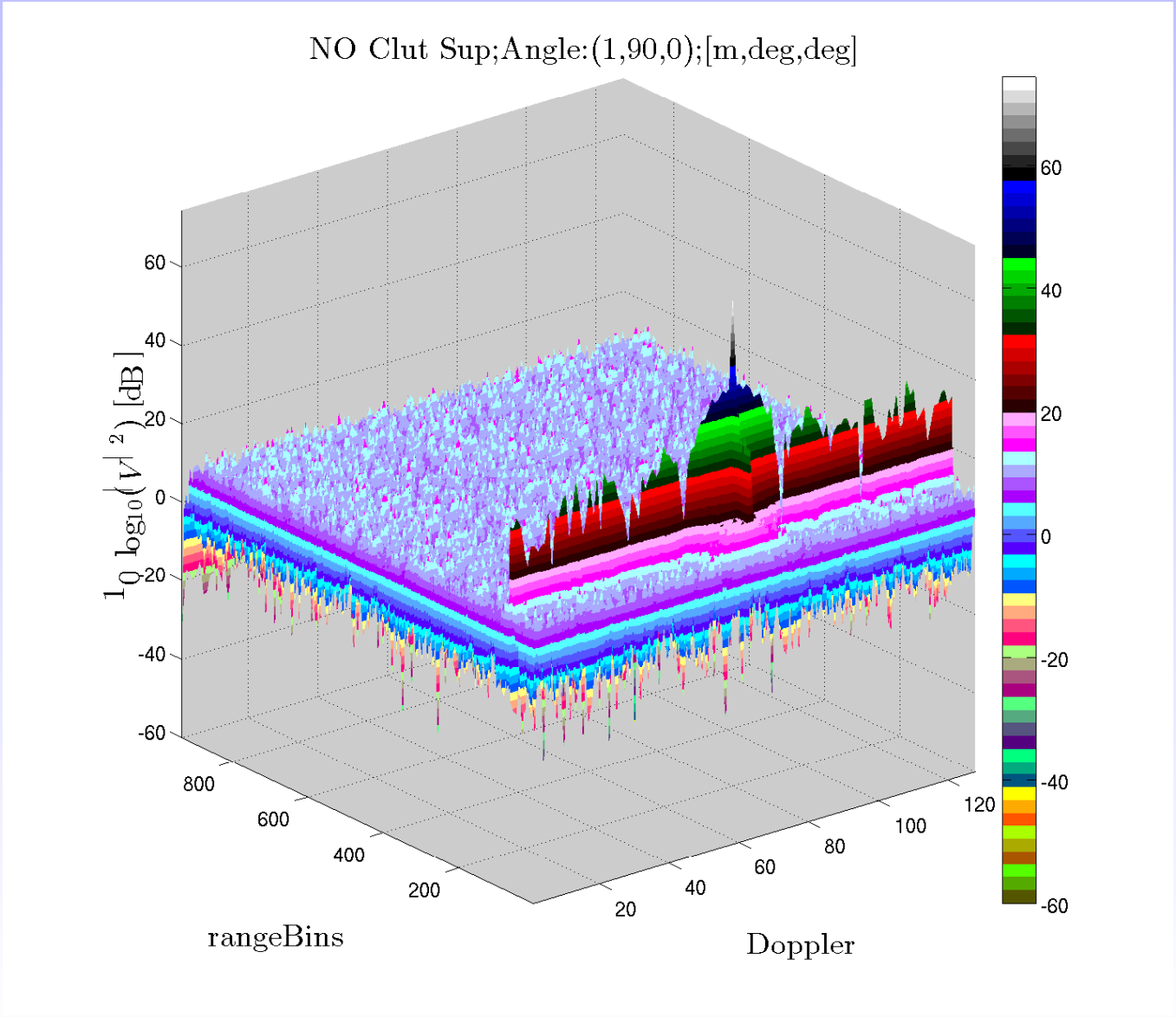
Doppler plot

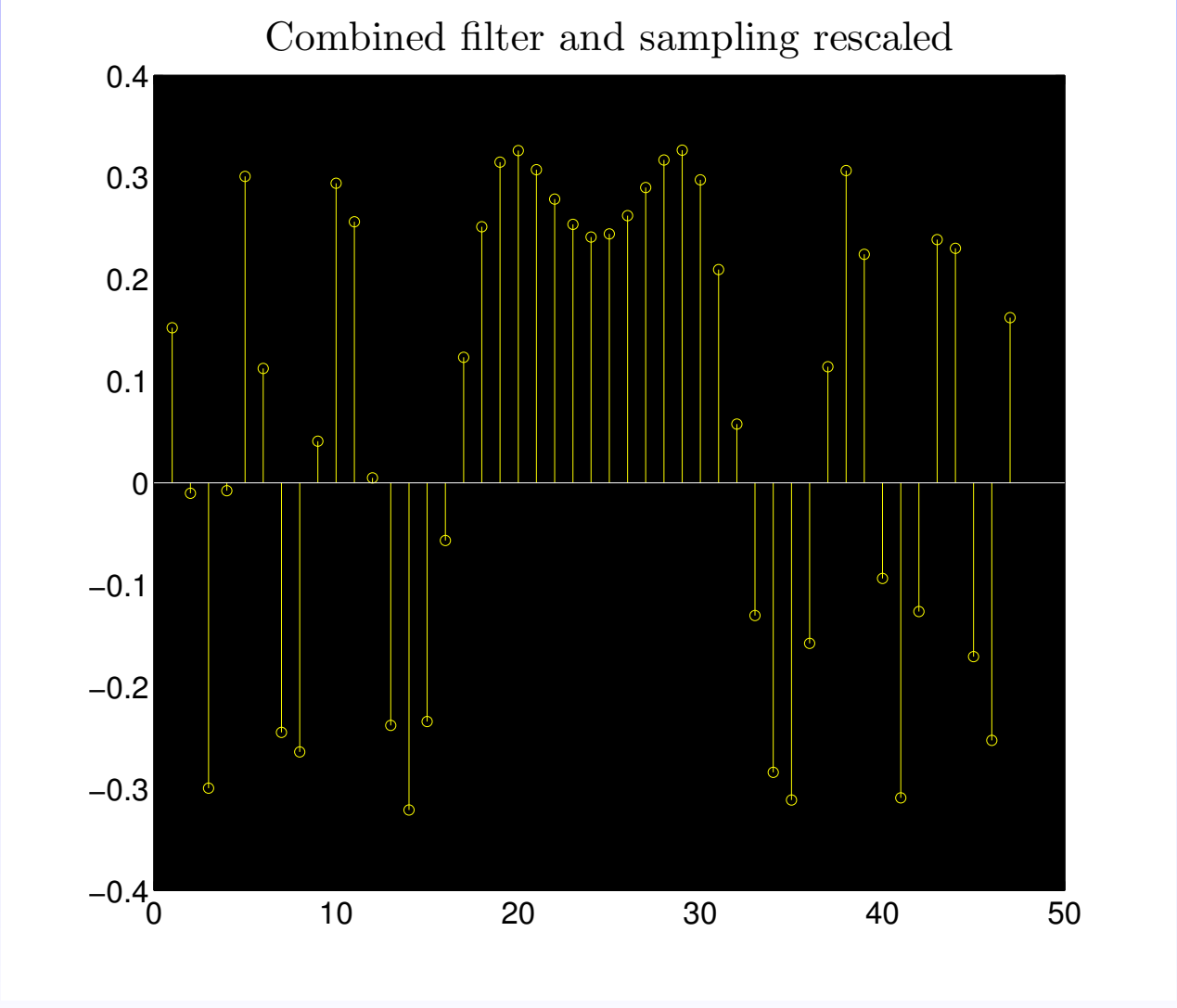
$\sigma = 1\text{m}^2$, 100m/s, 128 pulse and clutter echo from target with $\sigma = 1e6\text{m}^2$



What's next?

- Check least detectable input power
- Different scenarios

First title


Combined filter and sampling rescaled
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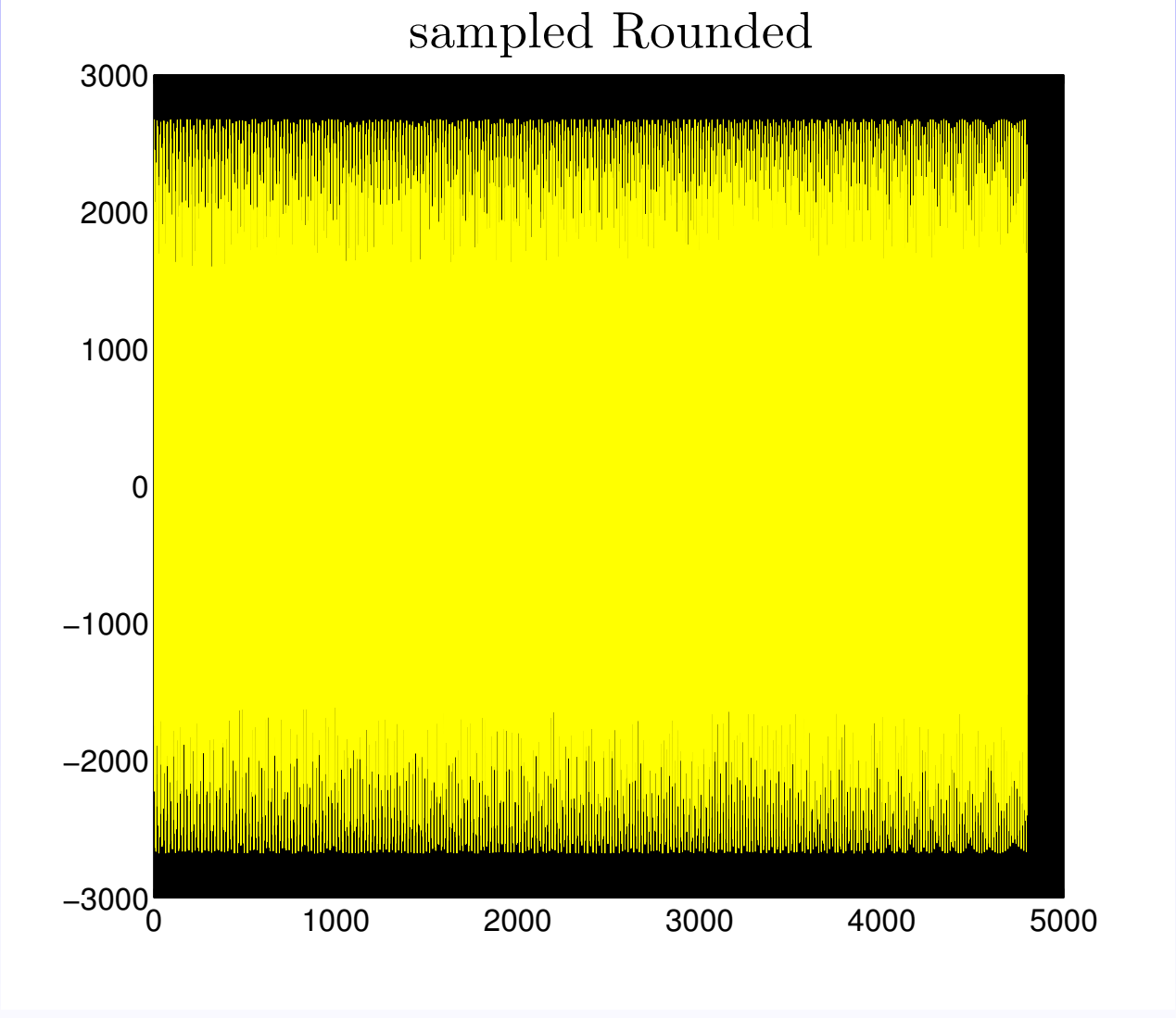
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
0
10
20
30
40
50

First title


sampled Rounded
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2000
1000
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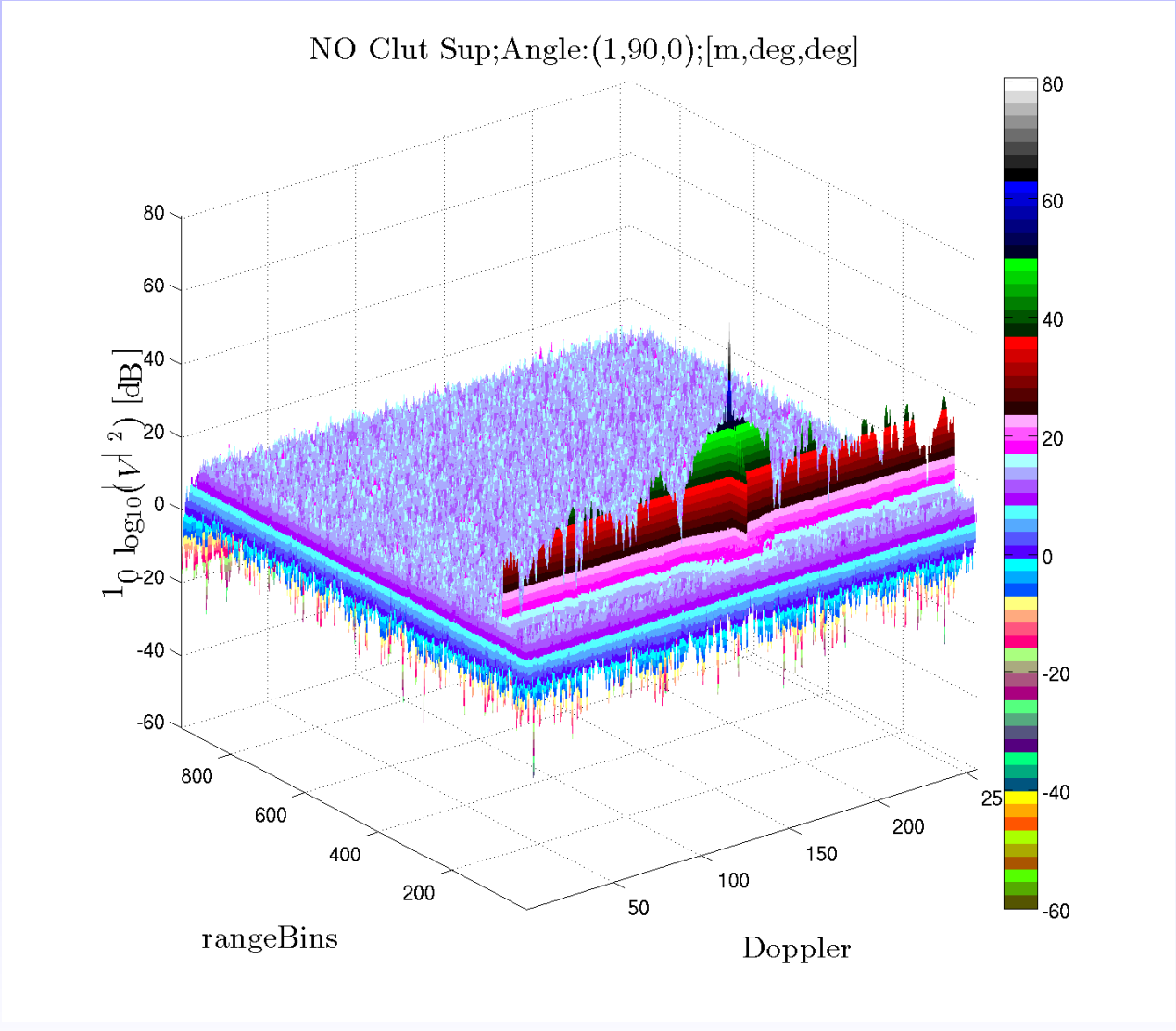
−1000
−2000
−3000
0
1000
2000
3000
4000
5000

First title


NO Clut Sup;Angle:(1,90,0);[m,deg,deg]
80
60
40
20
0
-20
-40
-60
$10\log_{10}(|V|^2)$ [dB]
800
600
400
200
rangeBins
50
100
150
200
25
Doppler
80
60
40
20
0
-20
-40
-60