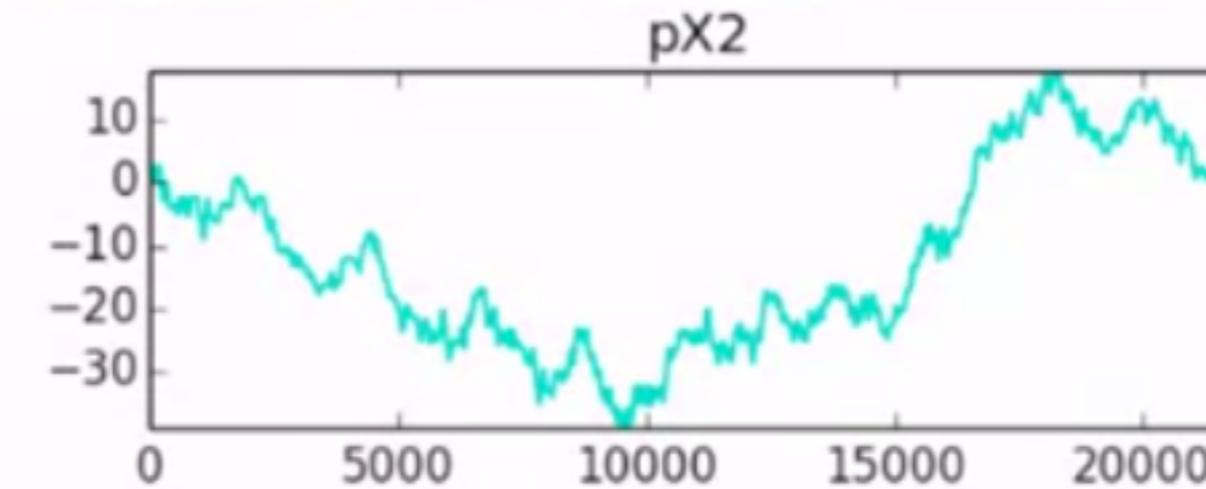
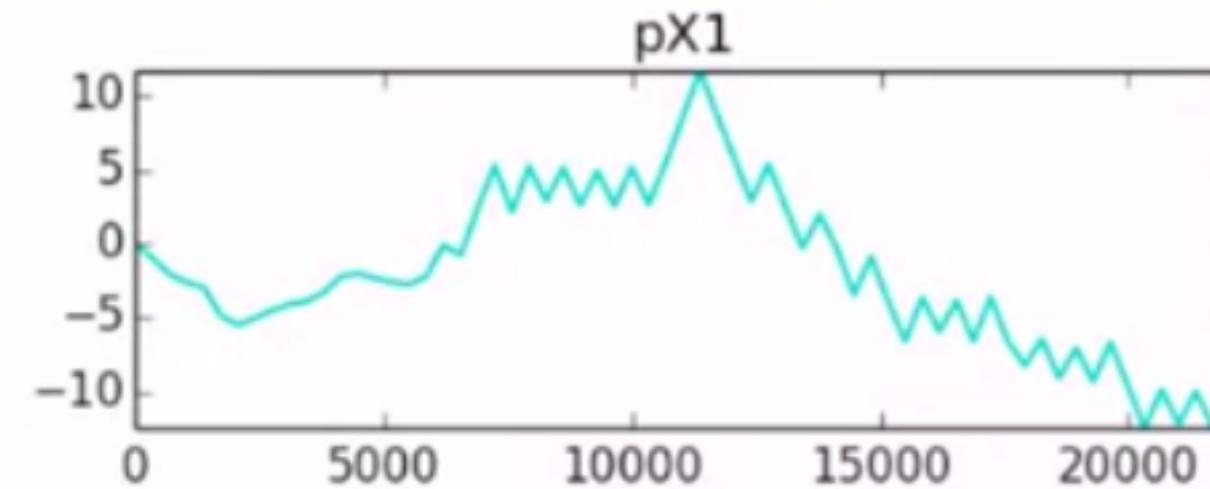
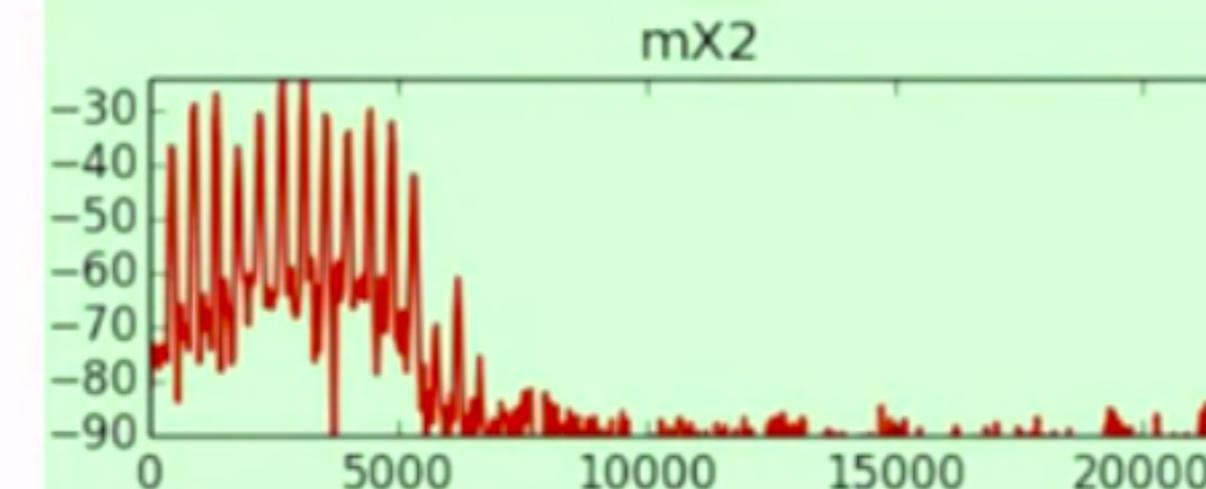
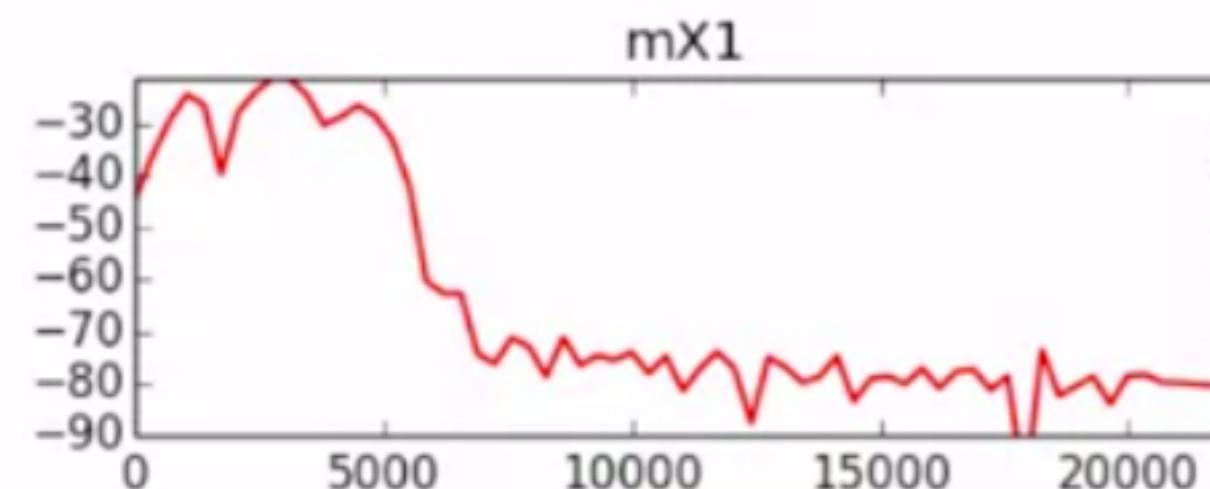
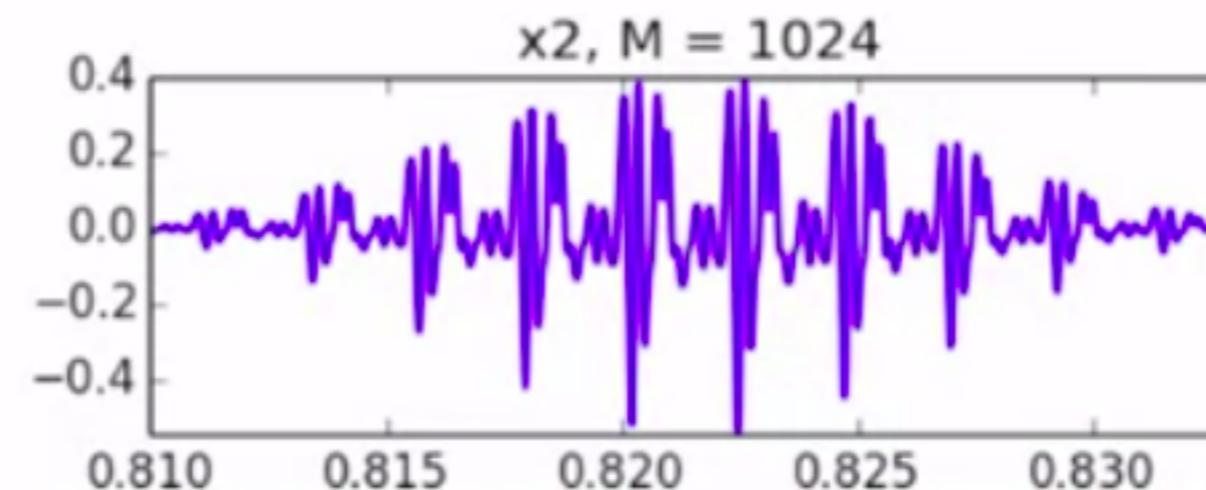
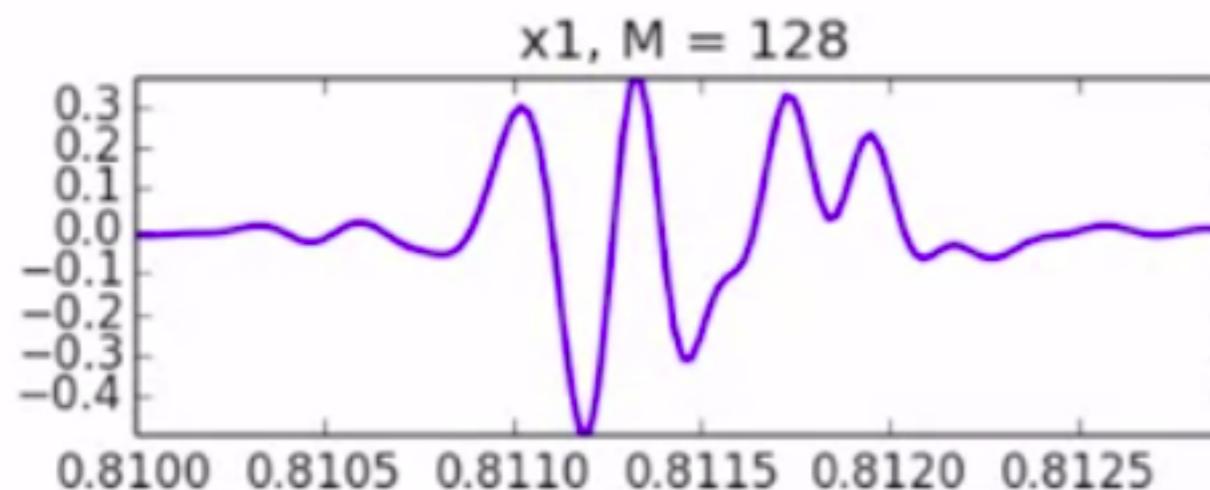
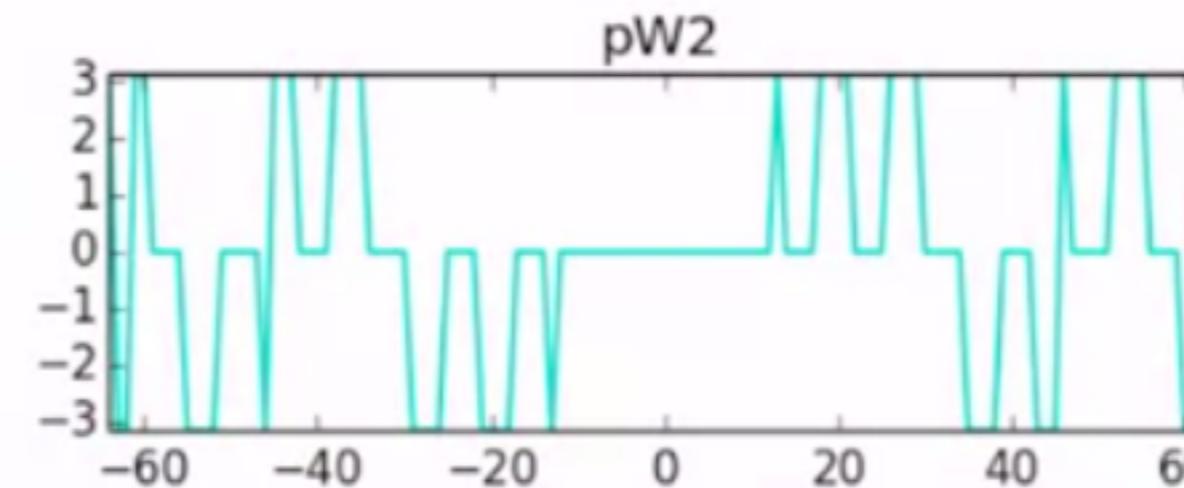
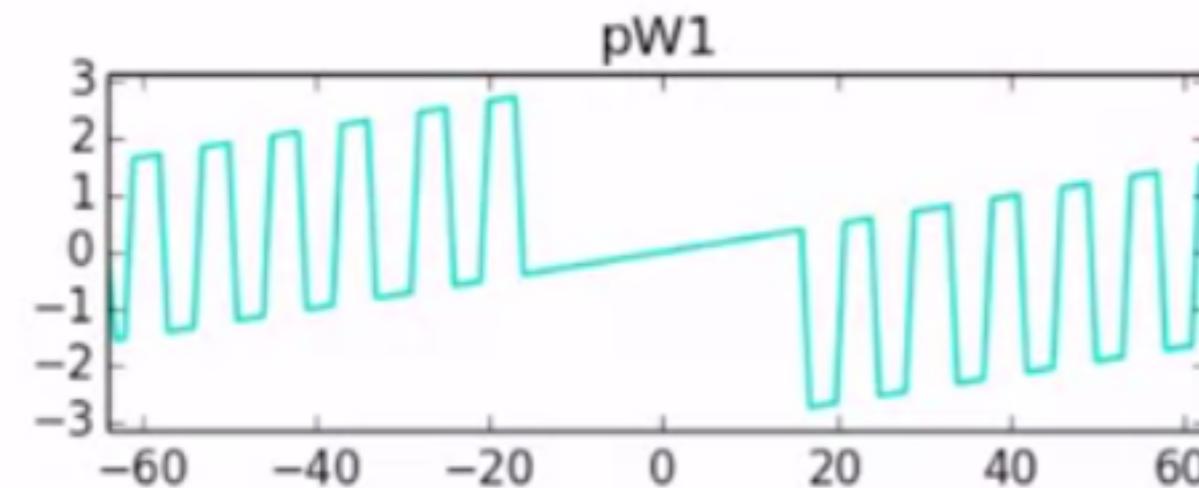
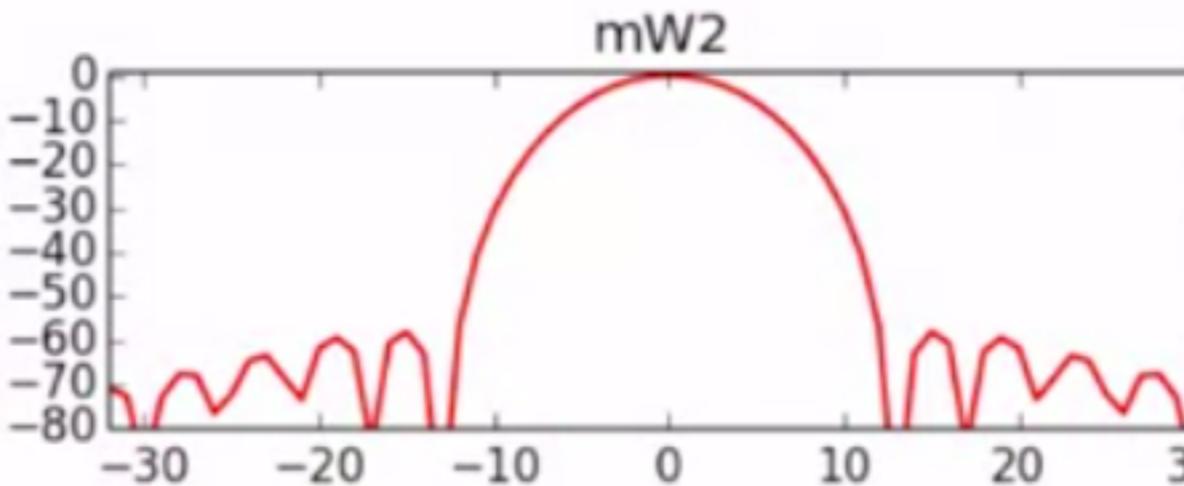
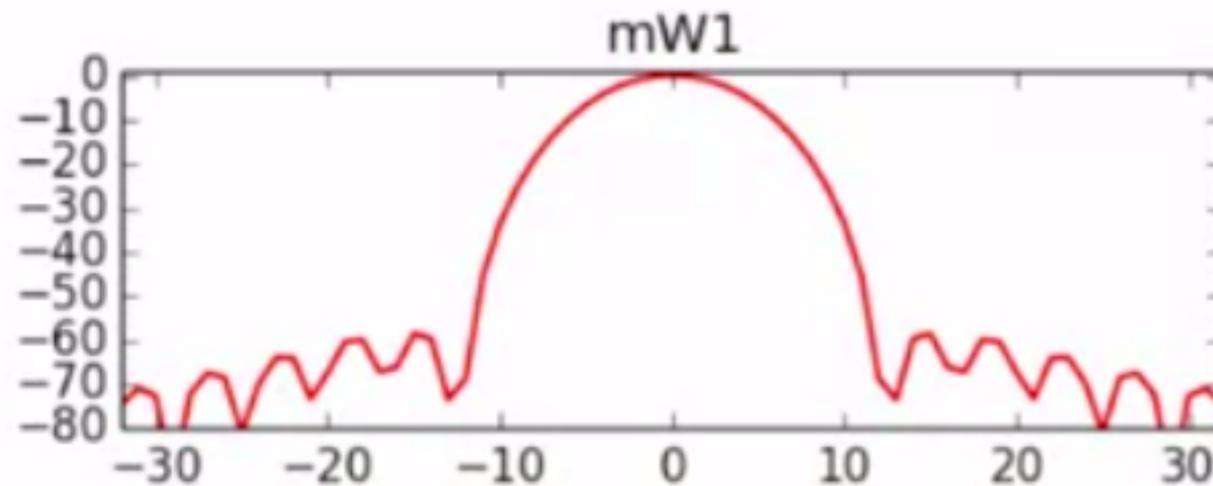
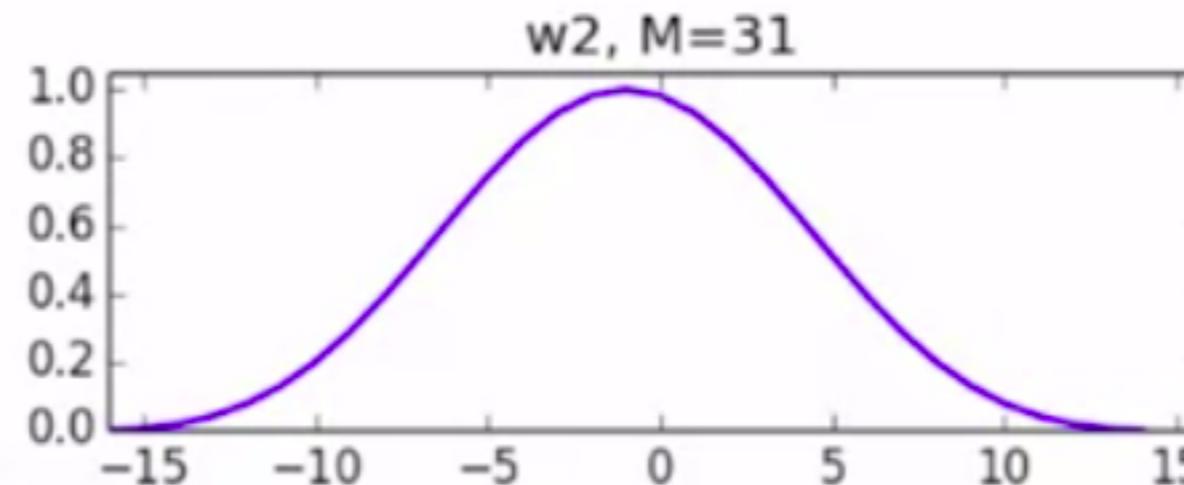
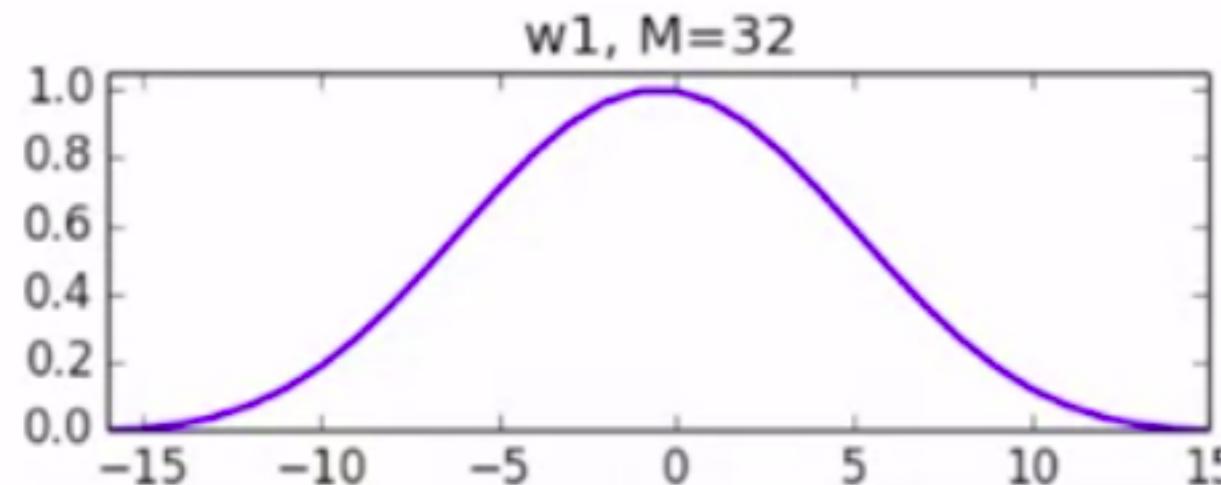


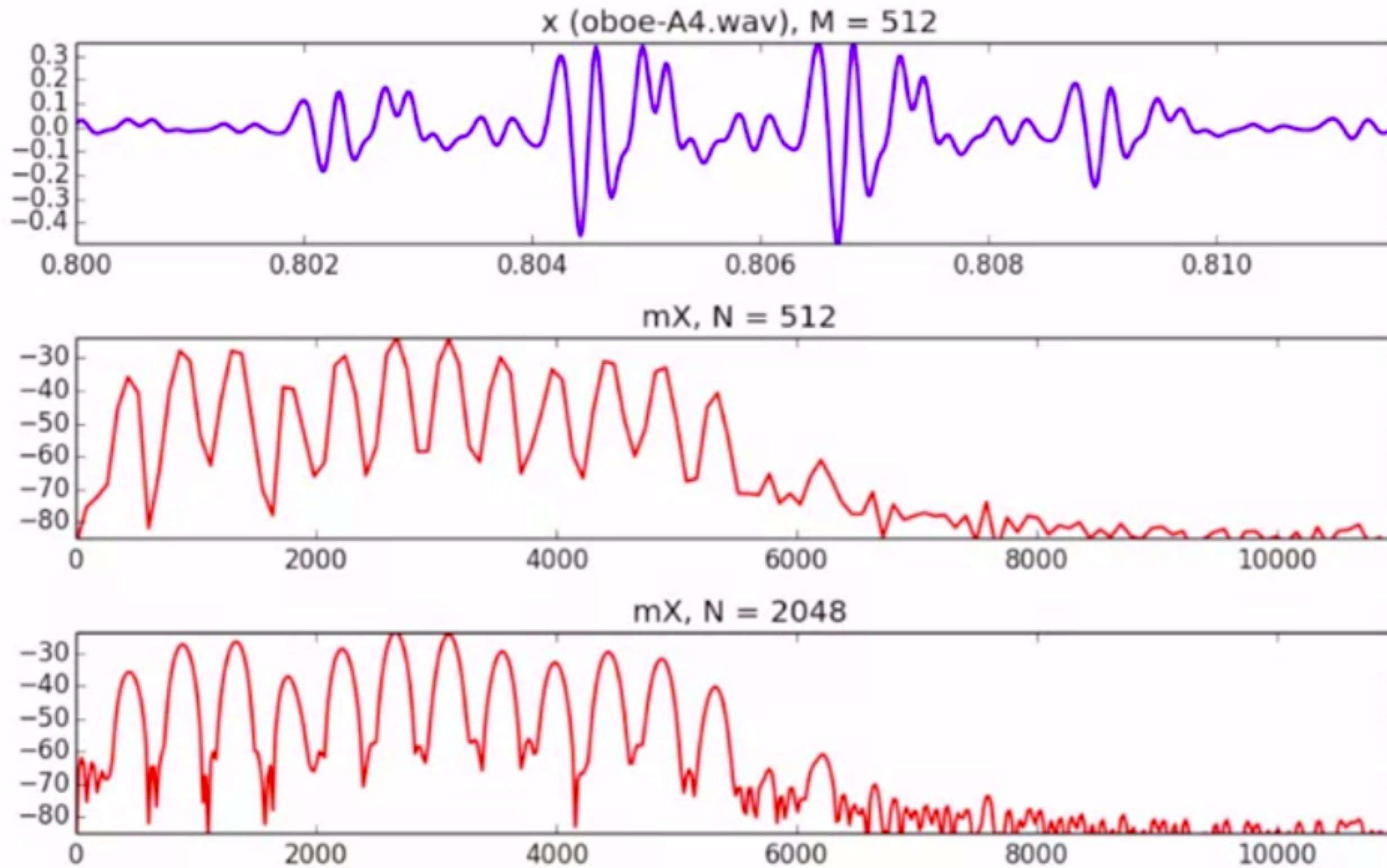
# Window size



# Even-odd size window

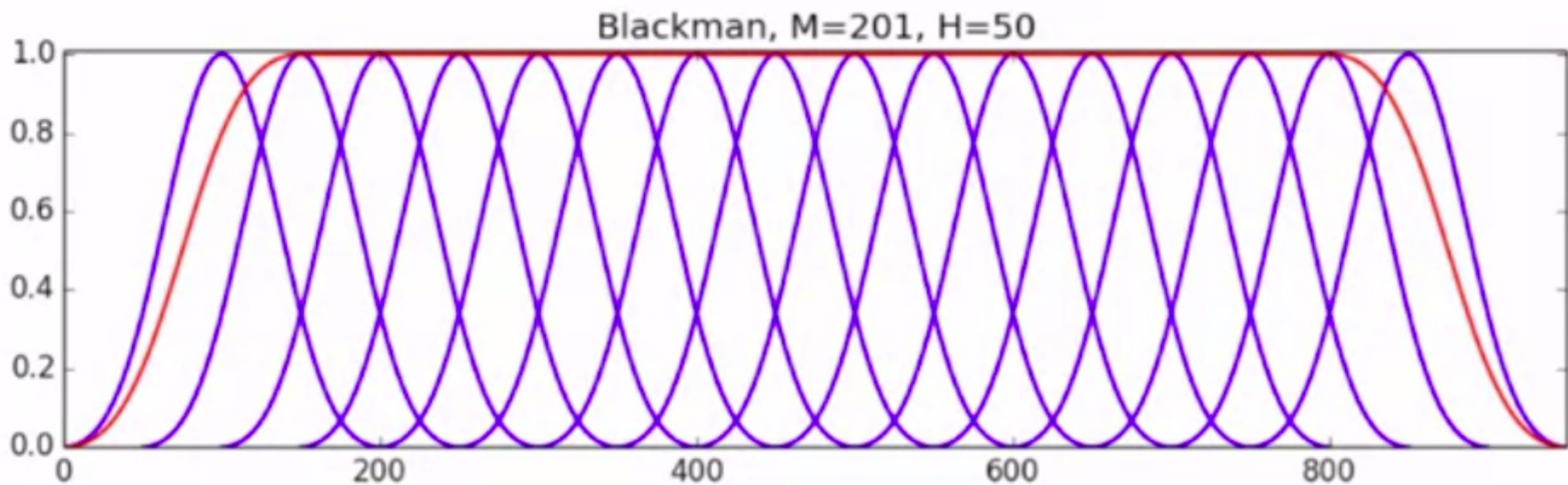
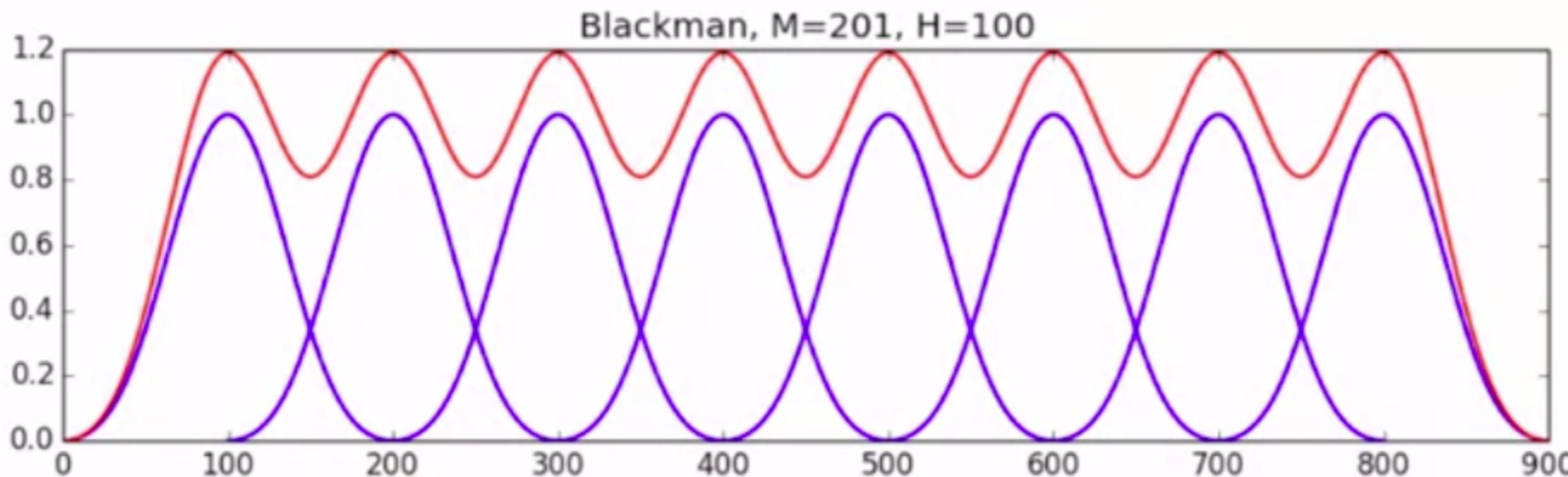


# FFT size

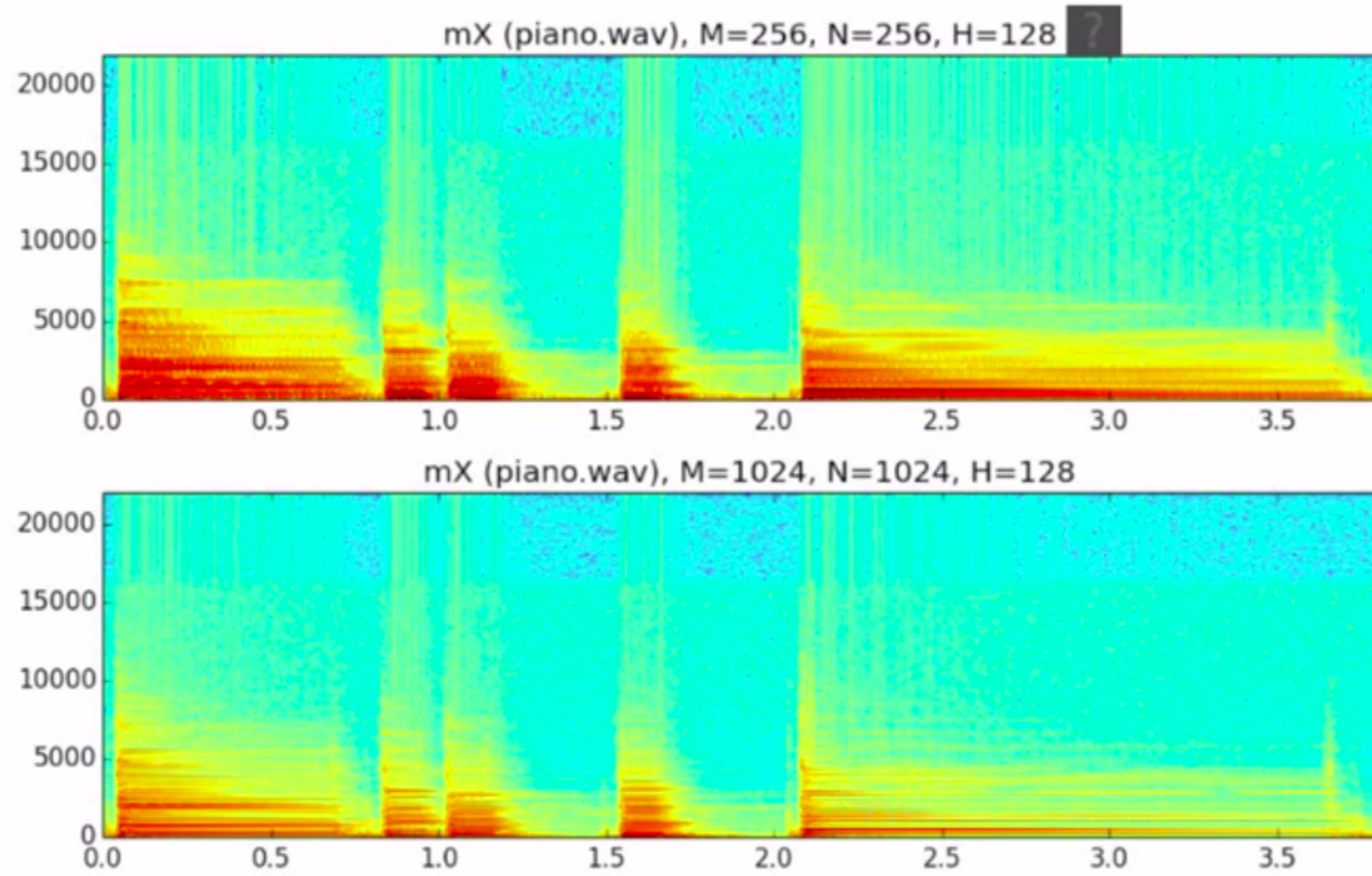


# Hop size

$$A_w[n] = \sum_{l=0}^{L-1} w[n-lH] = c$$

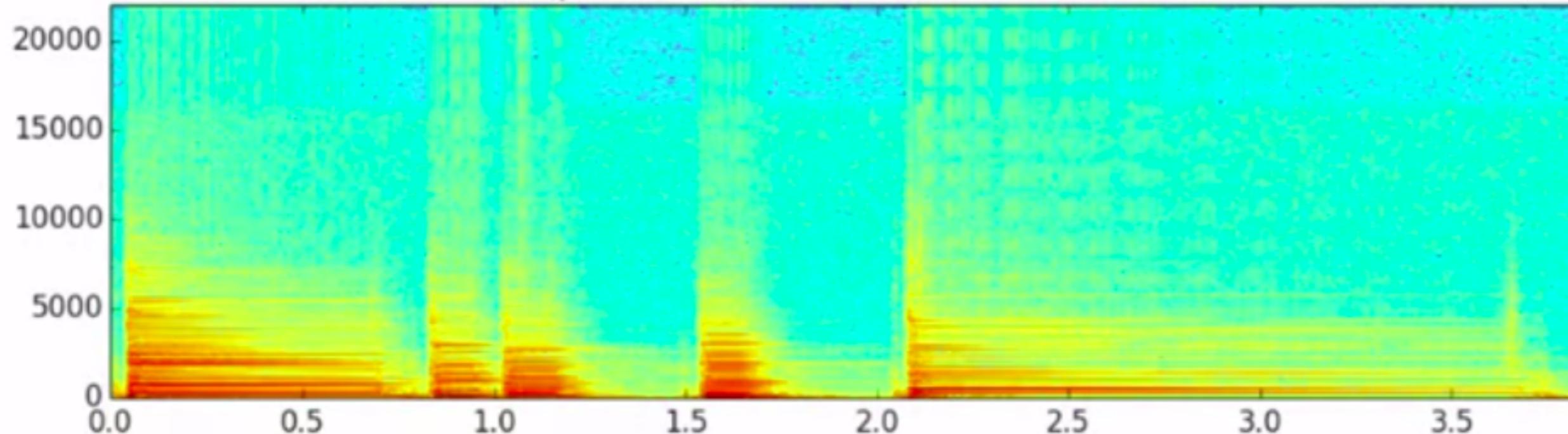


# Time-frequency compromise

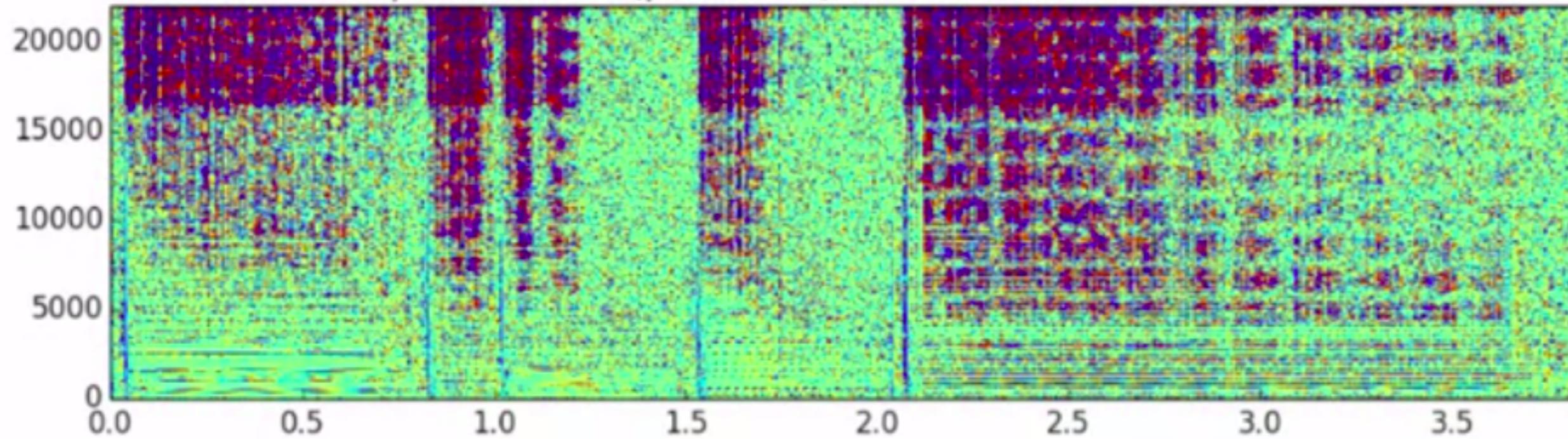


# Amplitude and phase spectrogram

mX (piano.wav), M=1001, N=1024, H=256



pX derivative (piano.wav), M=1001, N=1024, H=256



# Inverse STFT

$$y[n] = \sum_{l=0}^{L-1} Shift_{lH,n} \left[ \frac{1}{N} \sum_{k=-N/2}^{N/2-1} X_l[k] e^{j2\pi kn/N} \right]$$

each output frame is:

$$yw_l[n] = x(n+lH)w[n]$$

and the output sound is:

$$y[n] = \sum_{l=0}^{L-1} yw_l[n] = x[n] \sum_{l=0}^{L-1} w[n-lH]$$



# STFT system

