spoiler: it's a grab bag of magic tricks!

Getting WiFi to go Faster!

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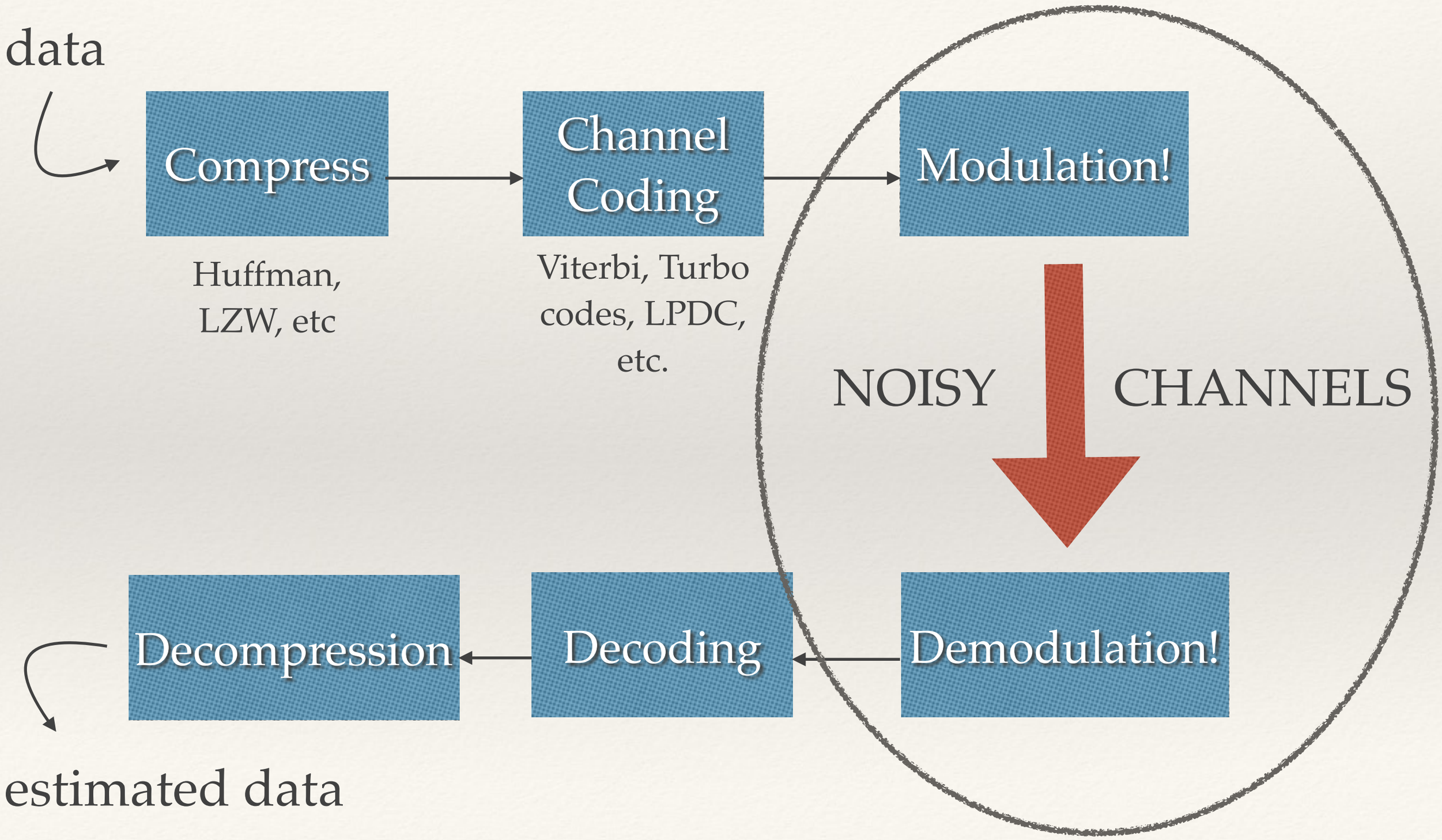
An Overview!

data

????

estimated data

An Overview!


data
Compress
Huffman, LZW, etc
Channel Coding
Viterbi, Turbo codes, LPDC, etc.
Modulation!
NOISY CHANNELS
Demodulation!
Decoding
Decompression
estimated data

Shannon-Hartley Theorem

bandwidth of the channel

$$C = B \log_2 (1+S/N)$$

Channel capacity in bits/s

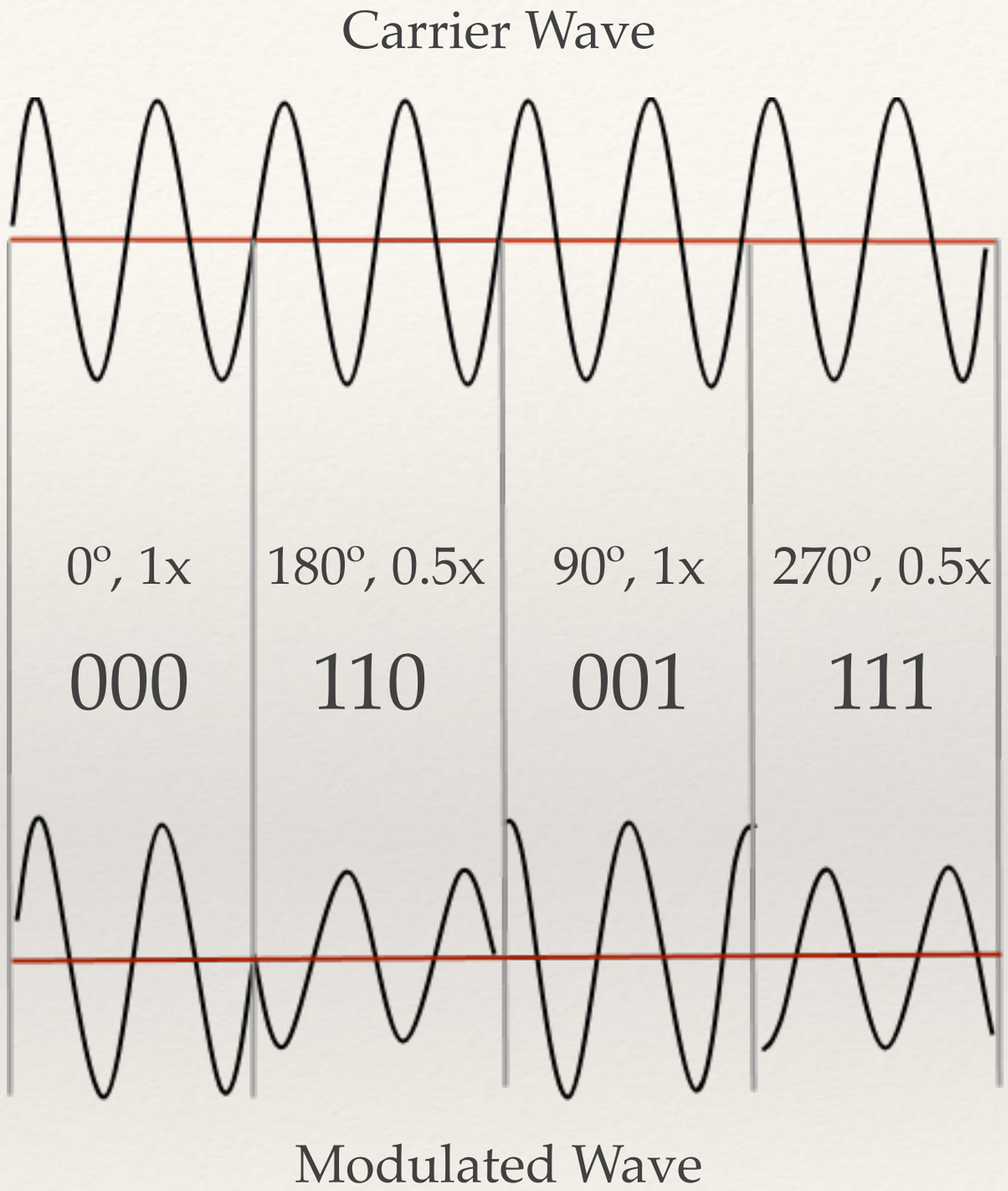
signal-to-noise ratio

Getting More out of your Bandwidth

if you have more space, you can encode more information!

Phase-Amplitude Modulation

4 phases, 2 amplitudes = 8 symbols



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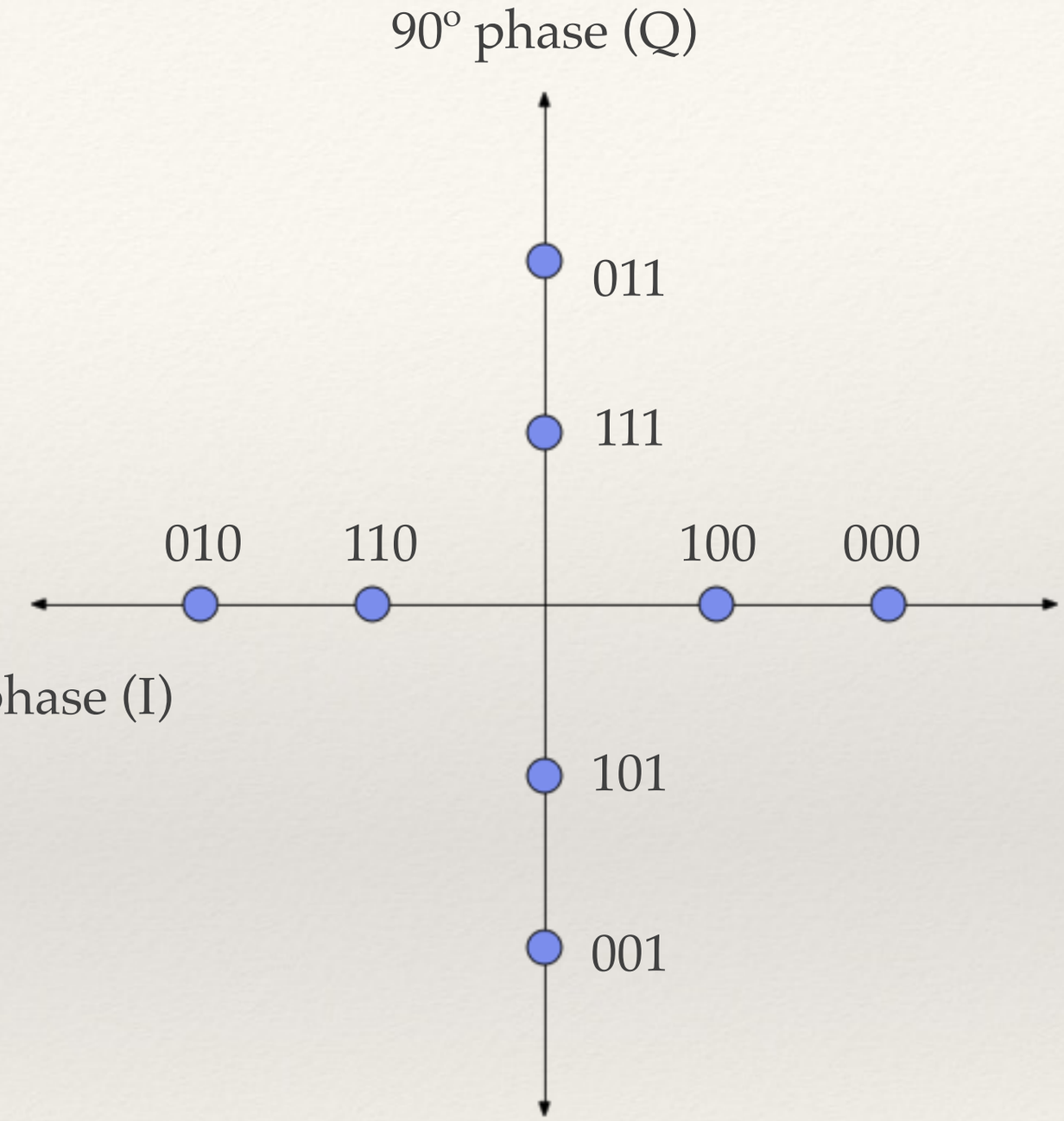
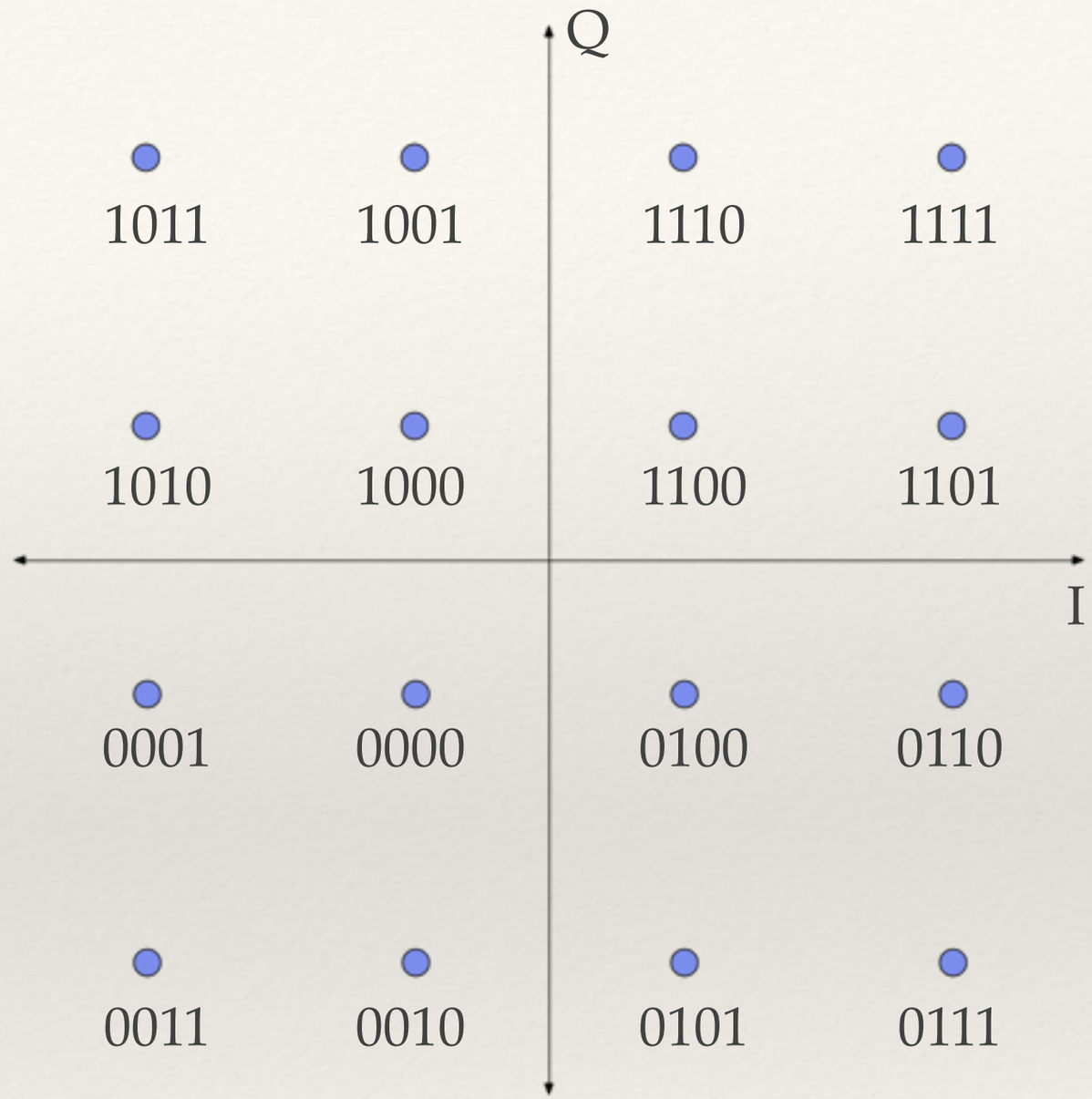
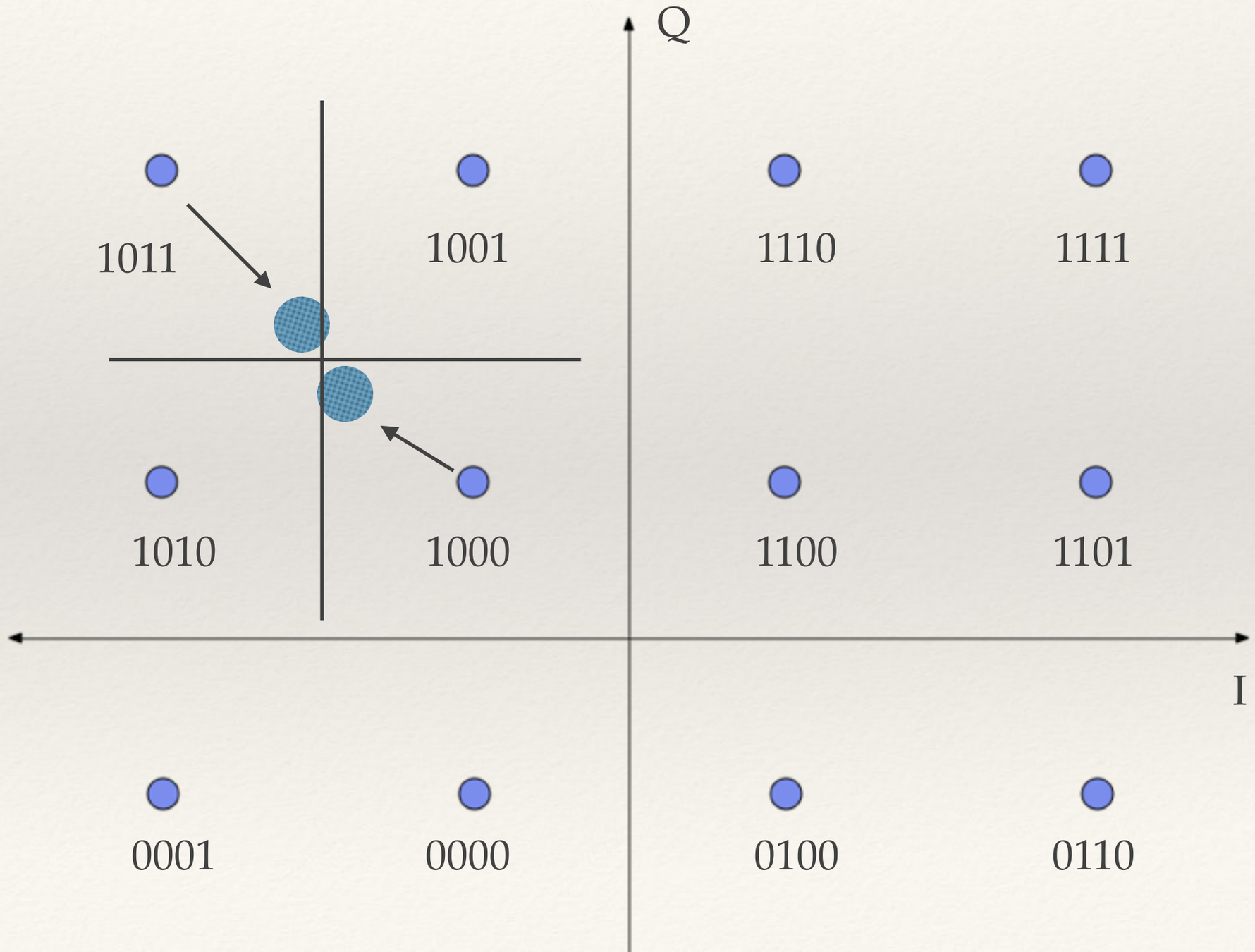


Optimizing Bandwidth

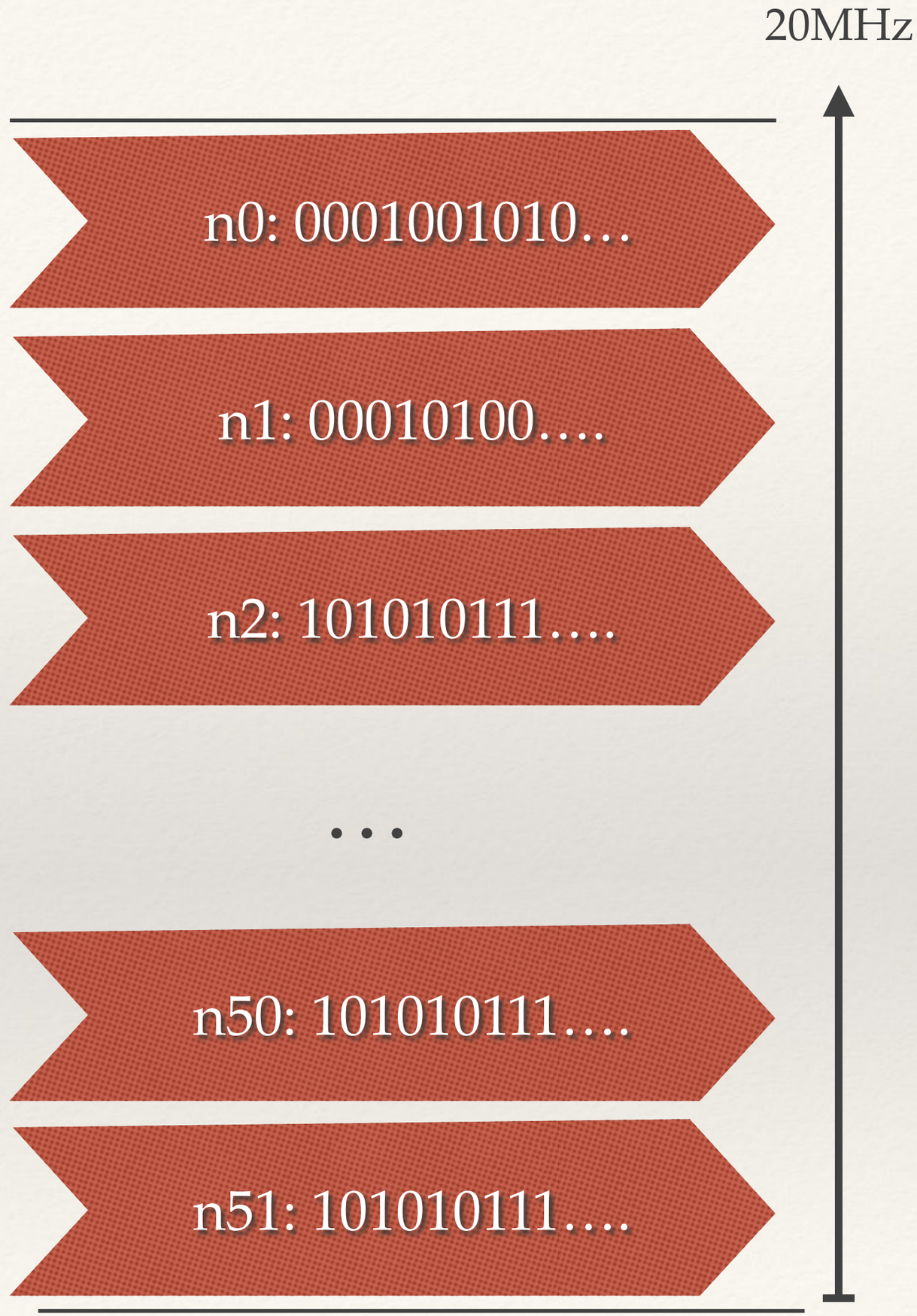


Tradeoff: Yelling over Noisy Channels



Optimizing Bandwidth: more!

52 independent streams in 20 MHz.



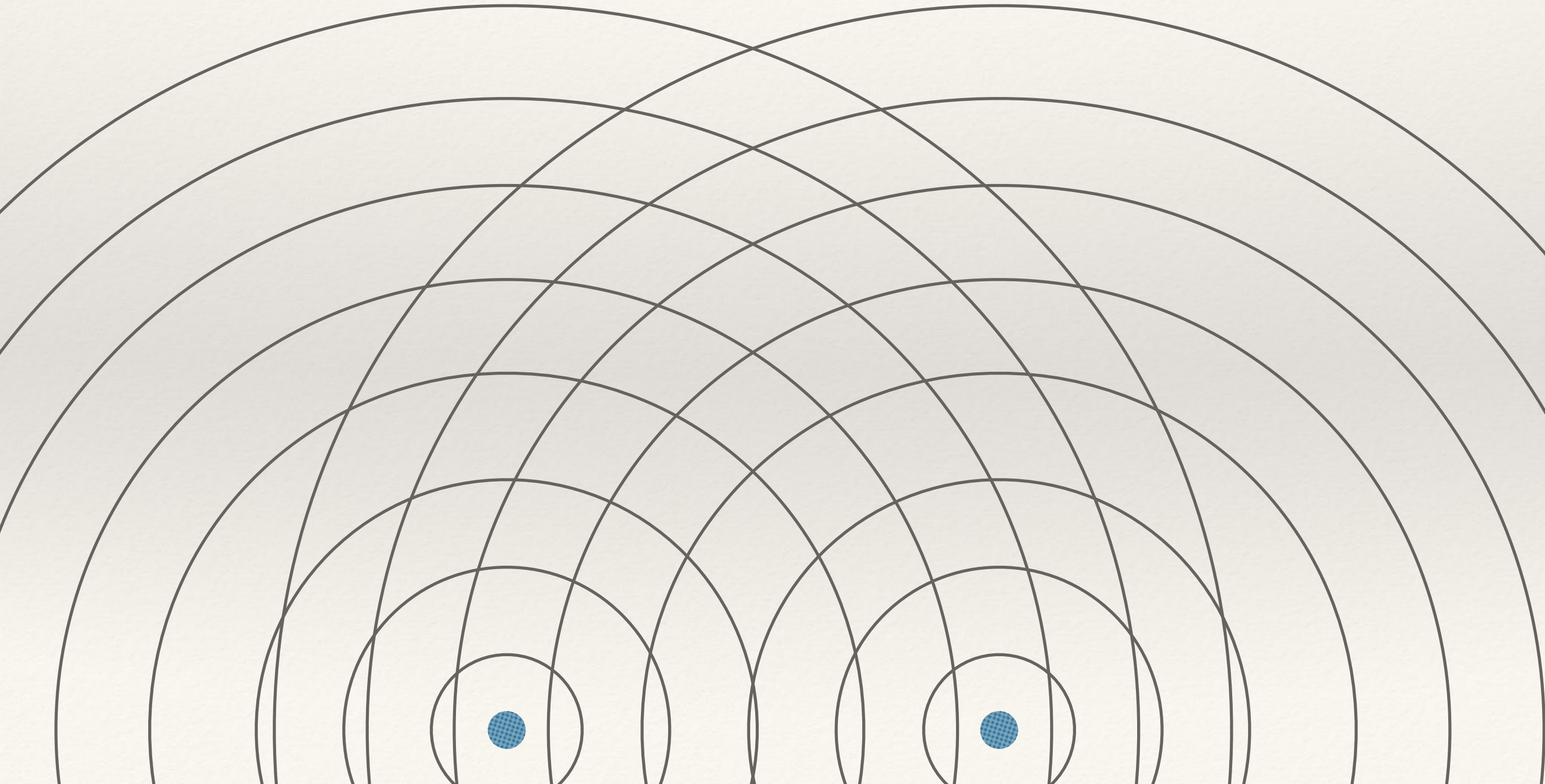
Tradeoff: Interference

Getting more out of your SNR

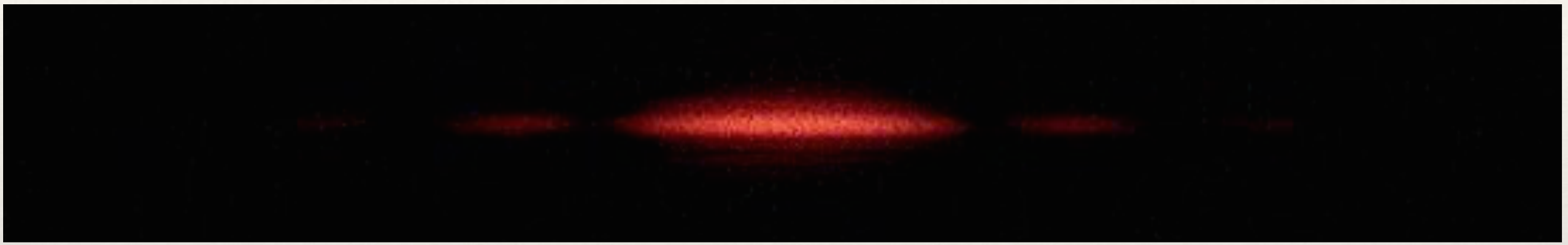
if you speak louder, you can speak faster!

Improving SNR: Beamforming

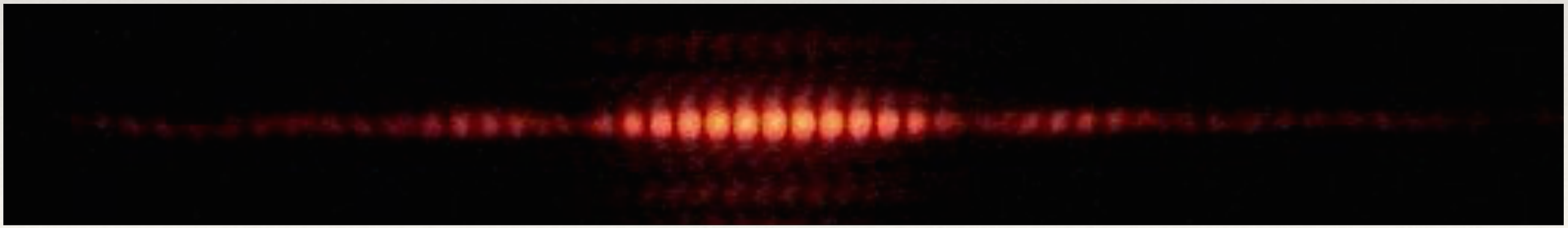
send out the same signal twice at 1/2 the power



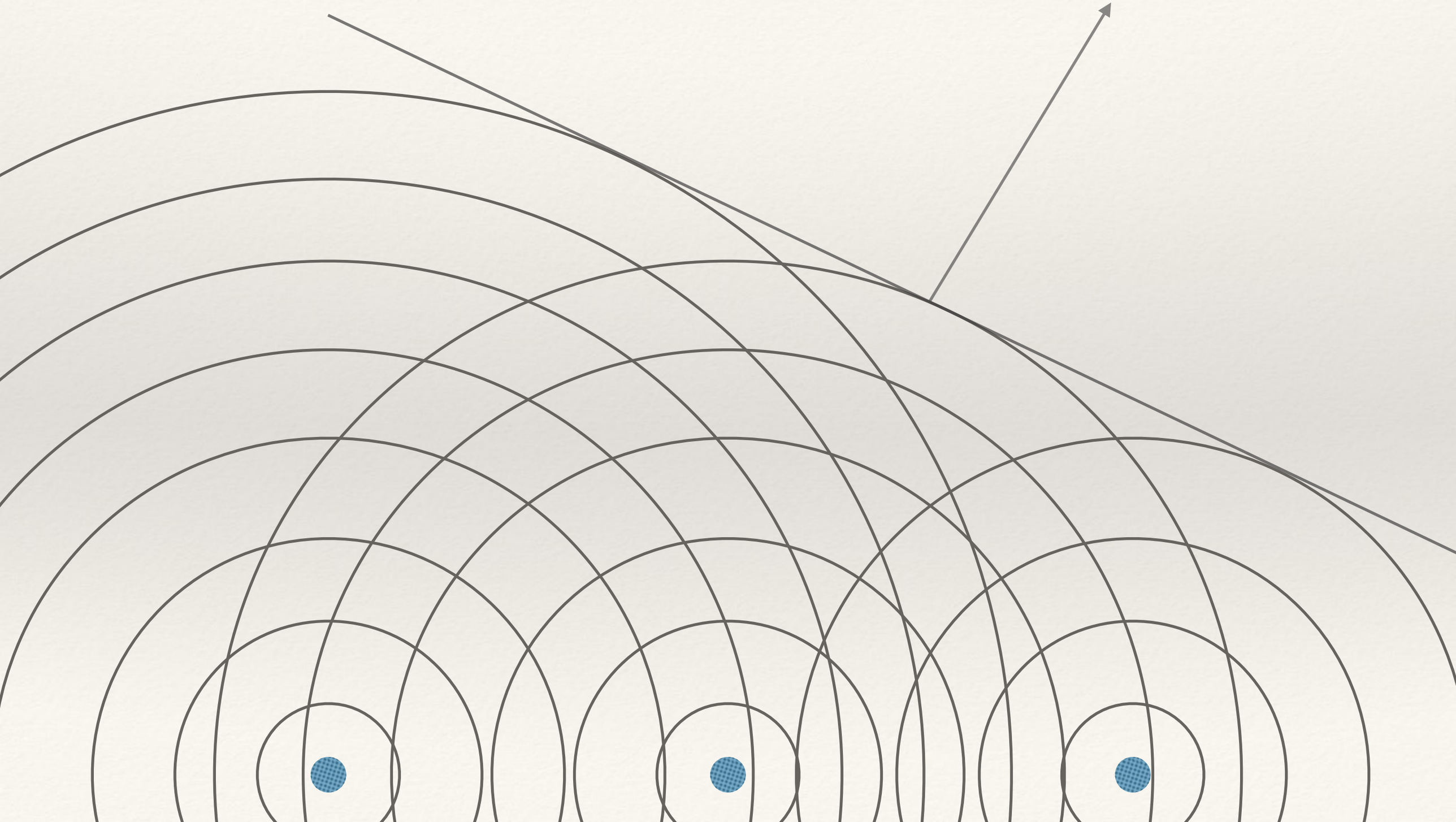
Improving SNR: Beamforming



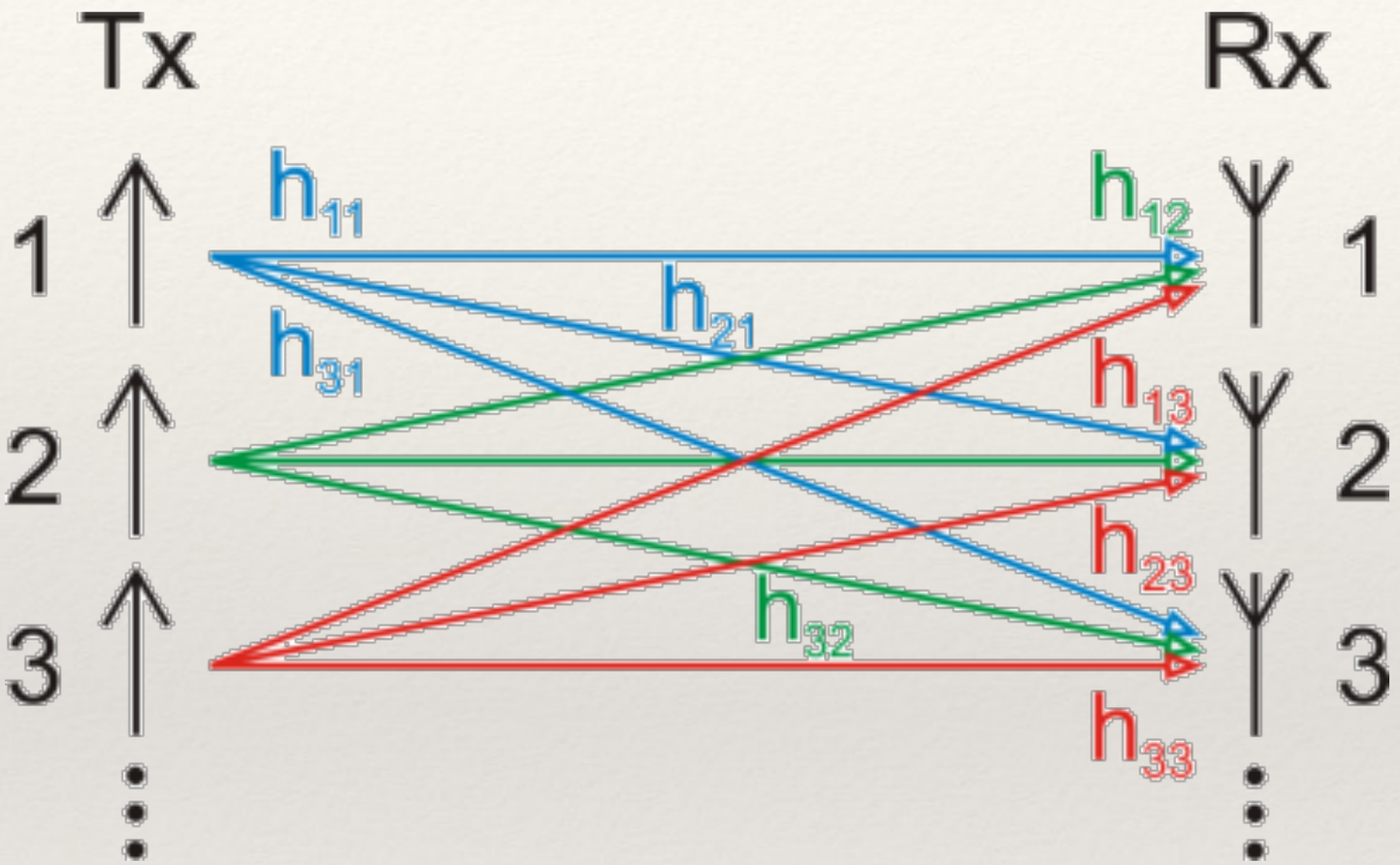
double the intensity at points!



Improving SNR: Beamforming



Improving SNR: spatial multiplexing



The Future

- MU-MIMO
- more bandwidth at 60GHz: 2 GHz!!
- ???

LINKS

- http://apenwarr.ca/
- wikipedia!
- whitepapers!