

Generation and Utilization of Frequency Combs

Brendan Lynch

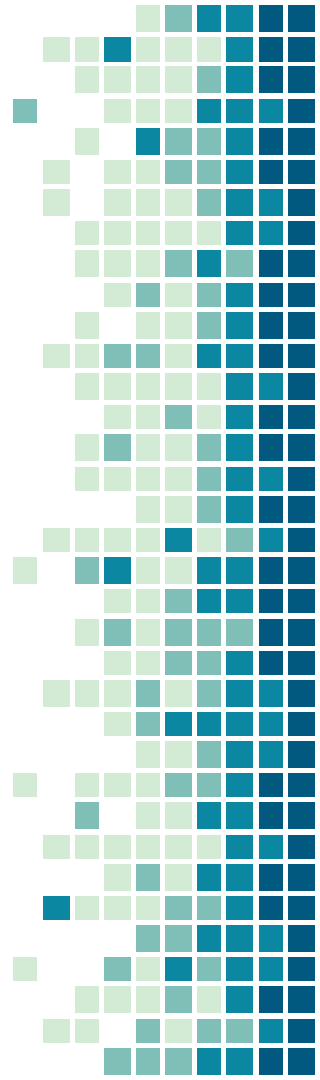




HELLO!

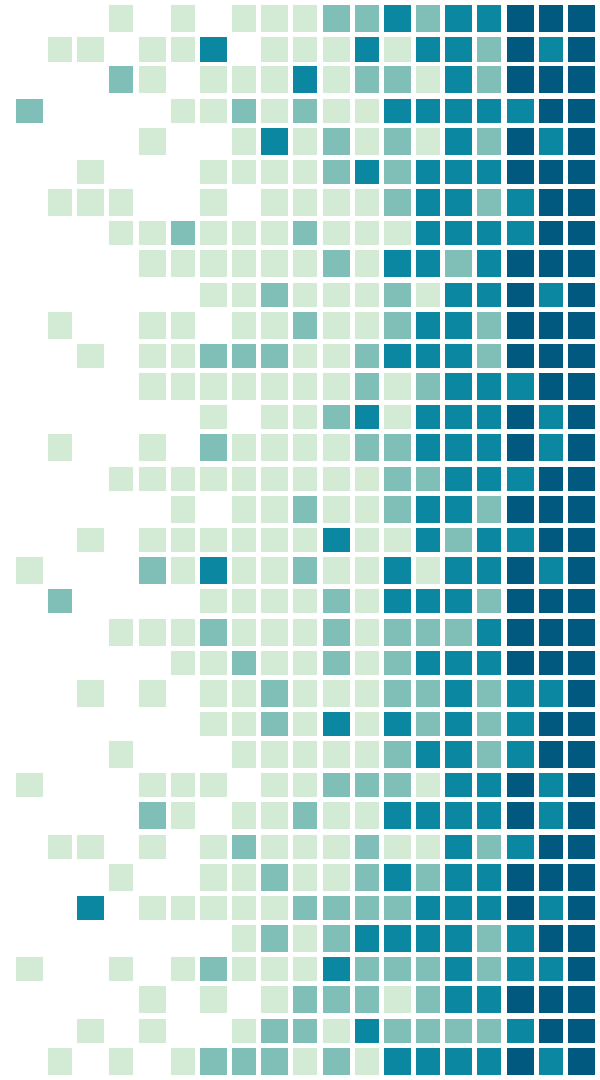
Frequency Combs

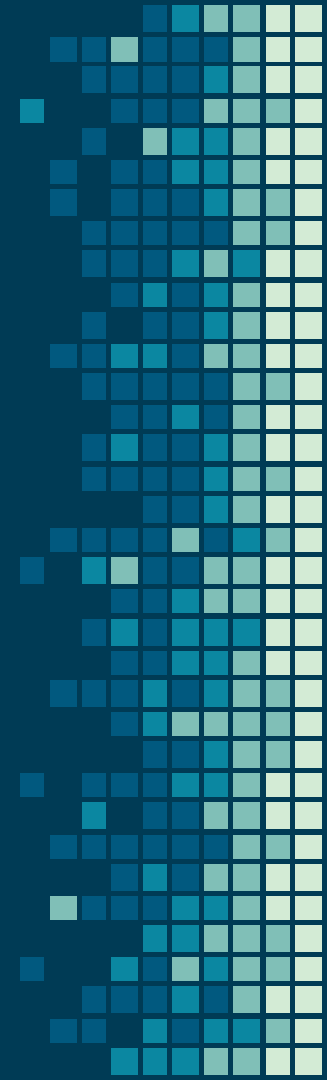
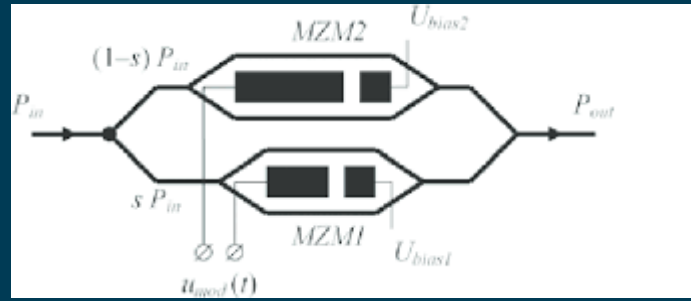
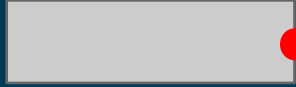
Necessary for the future of nanophotonics, and practical application in supercomputers, AI, and Data Centers.

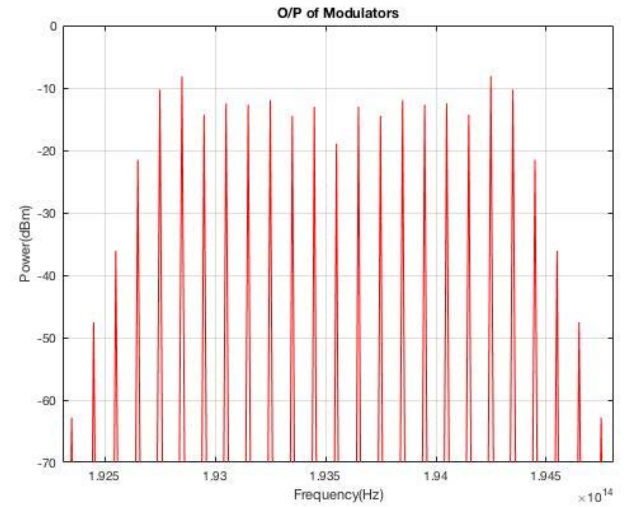
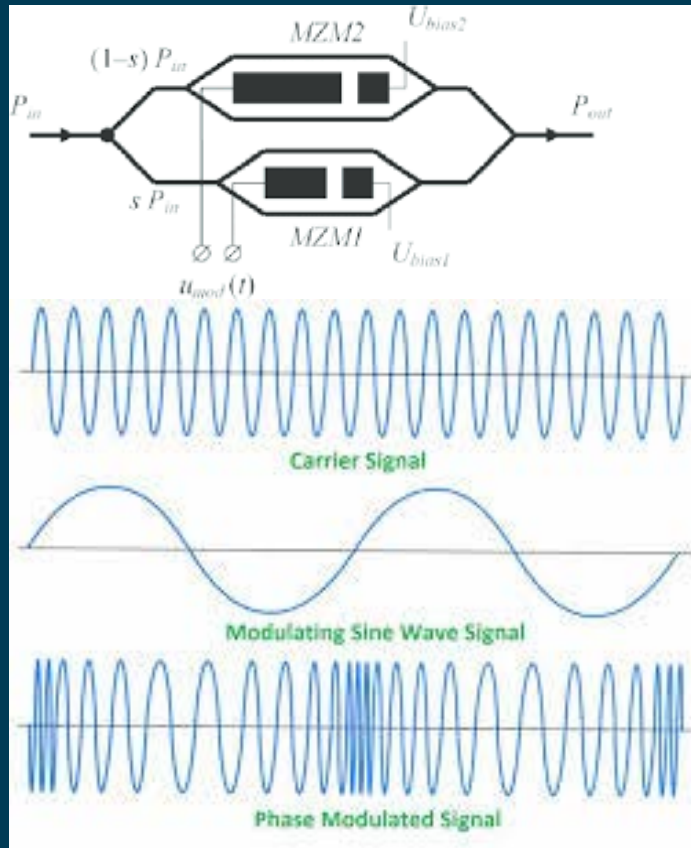


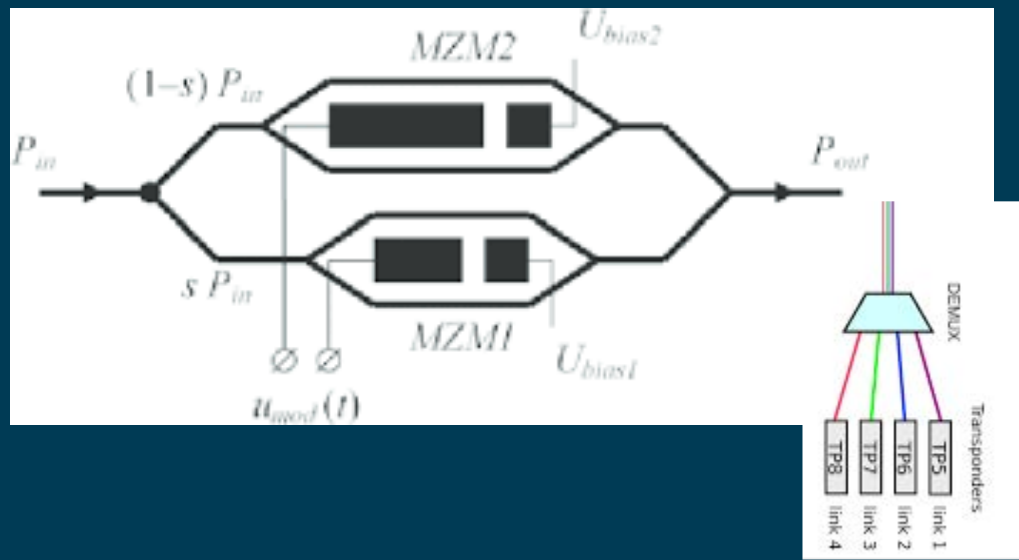
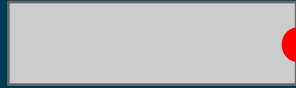
1. Overview of the System

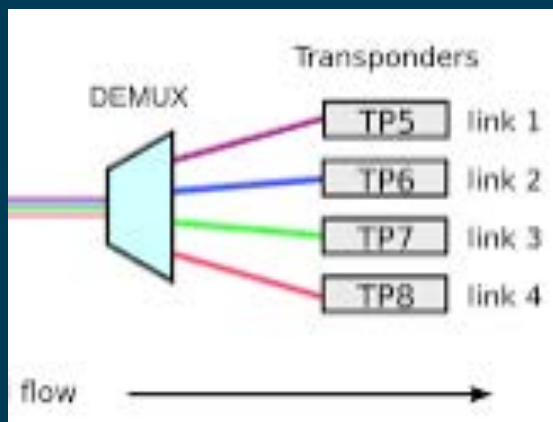
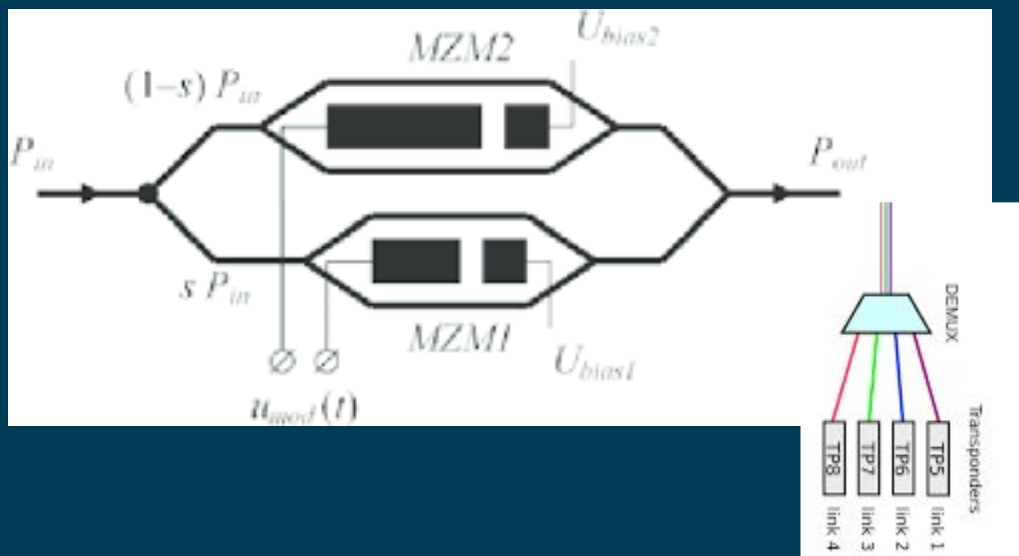
Let's start with an understanding of how the system is build.







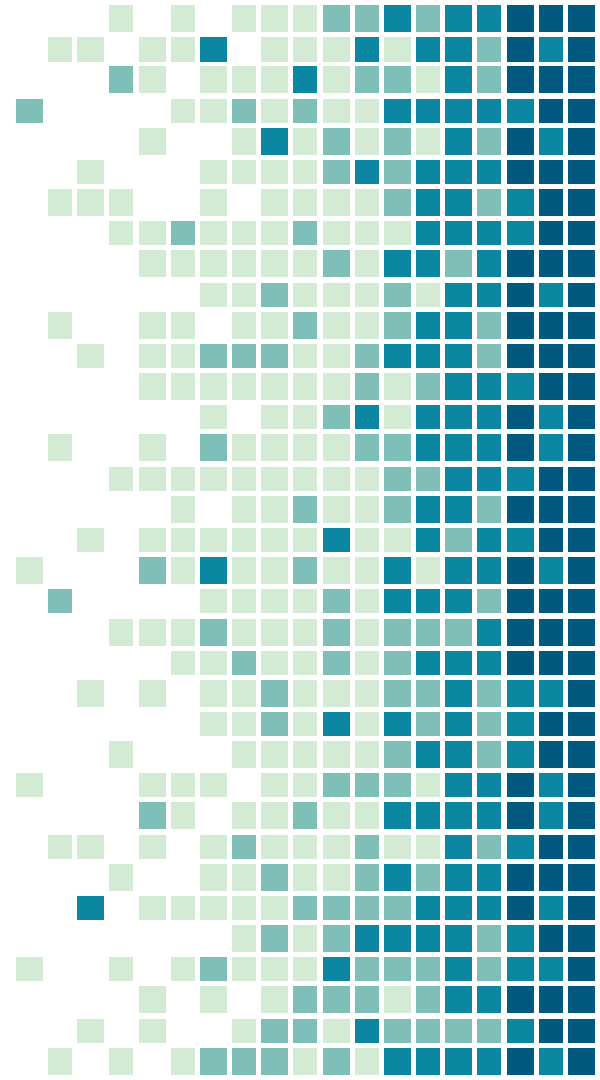




2.

The Difference between LEDs and Combs

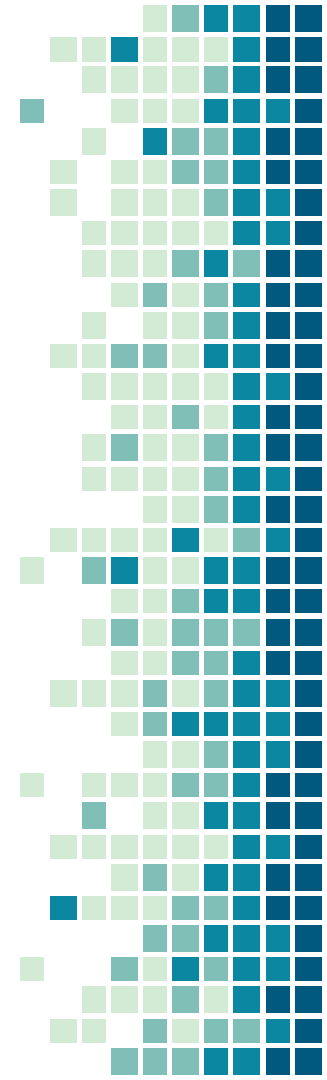
Why is optics switching to Combs

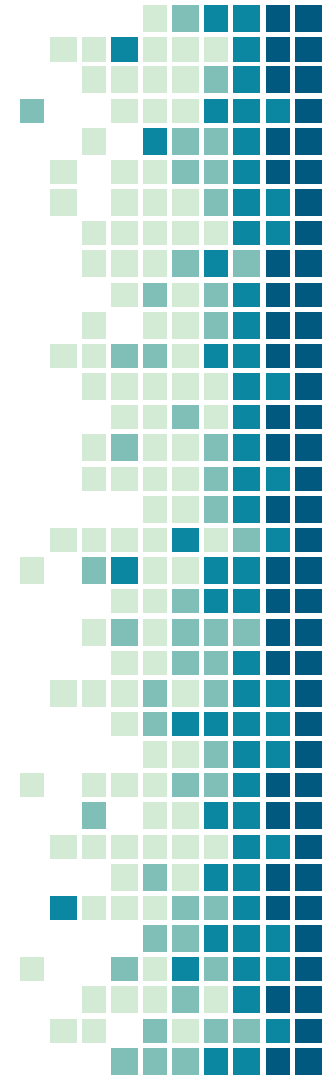
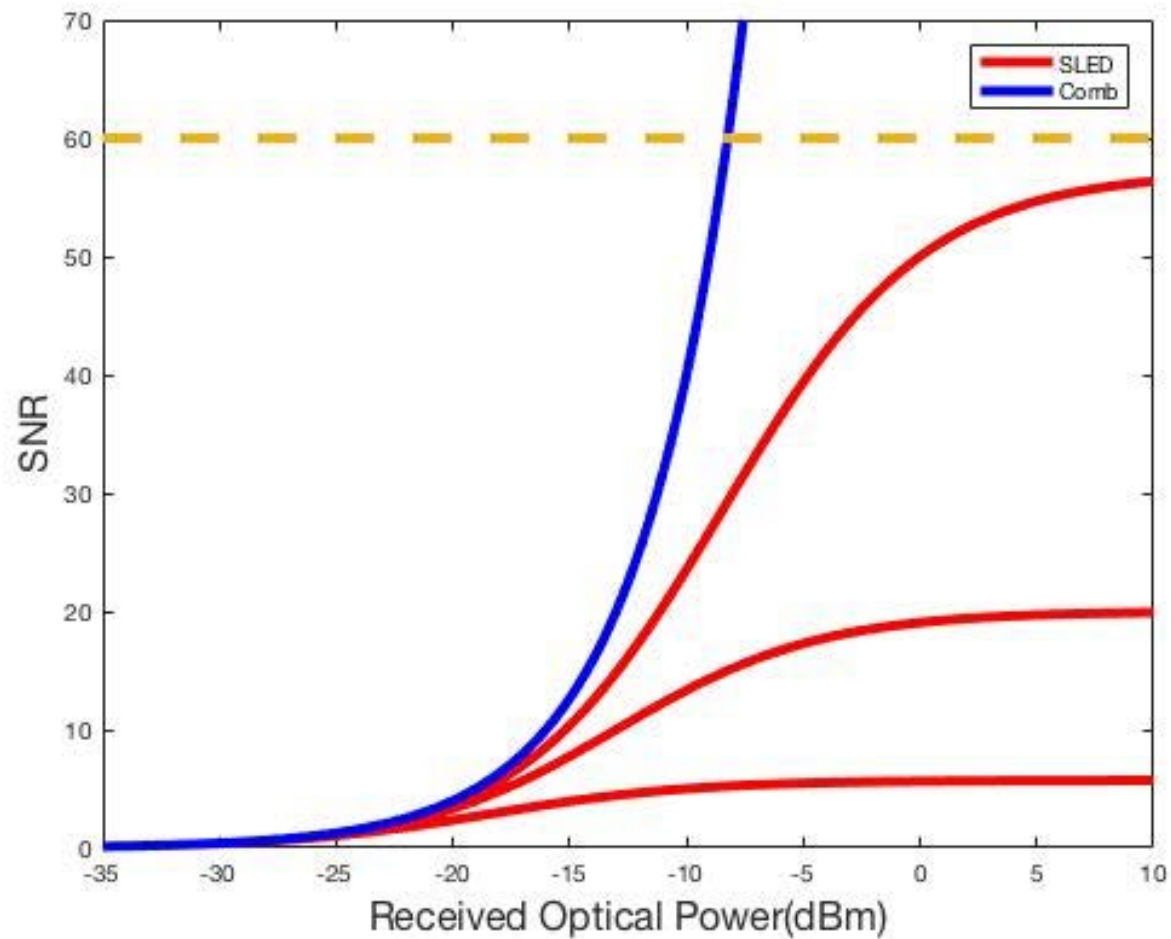


Options other than Combs

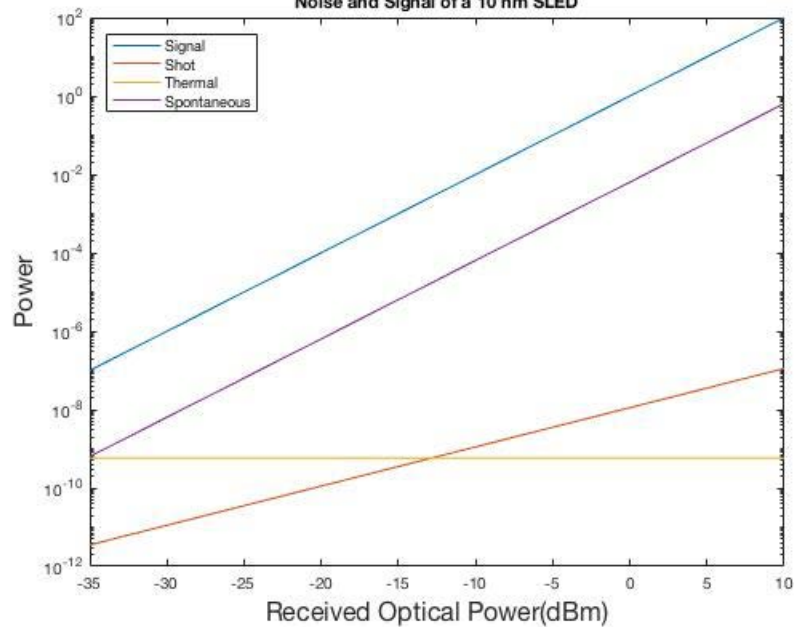
- LED's (Broadband light)
- Multiple Signals
- Single Line Communication

The use of frequency combs requires only one source, making use in nanophotonics more possible.

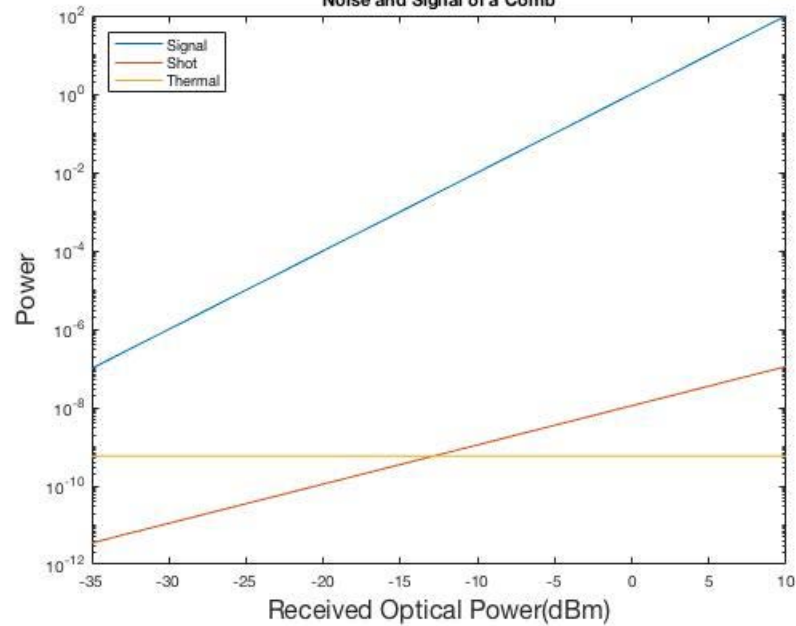


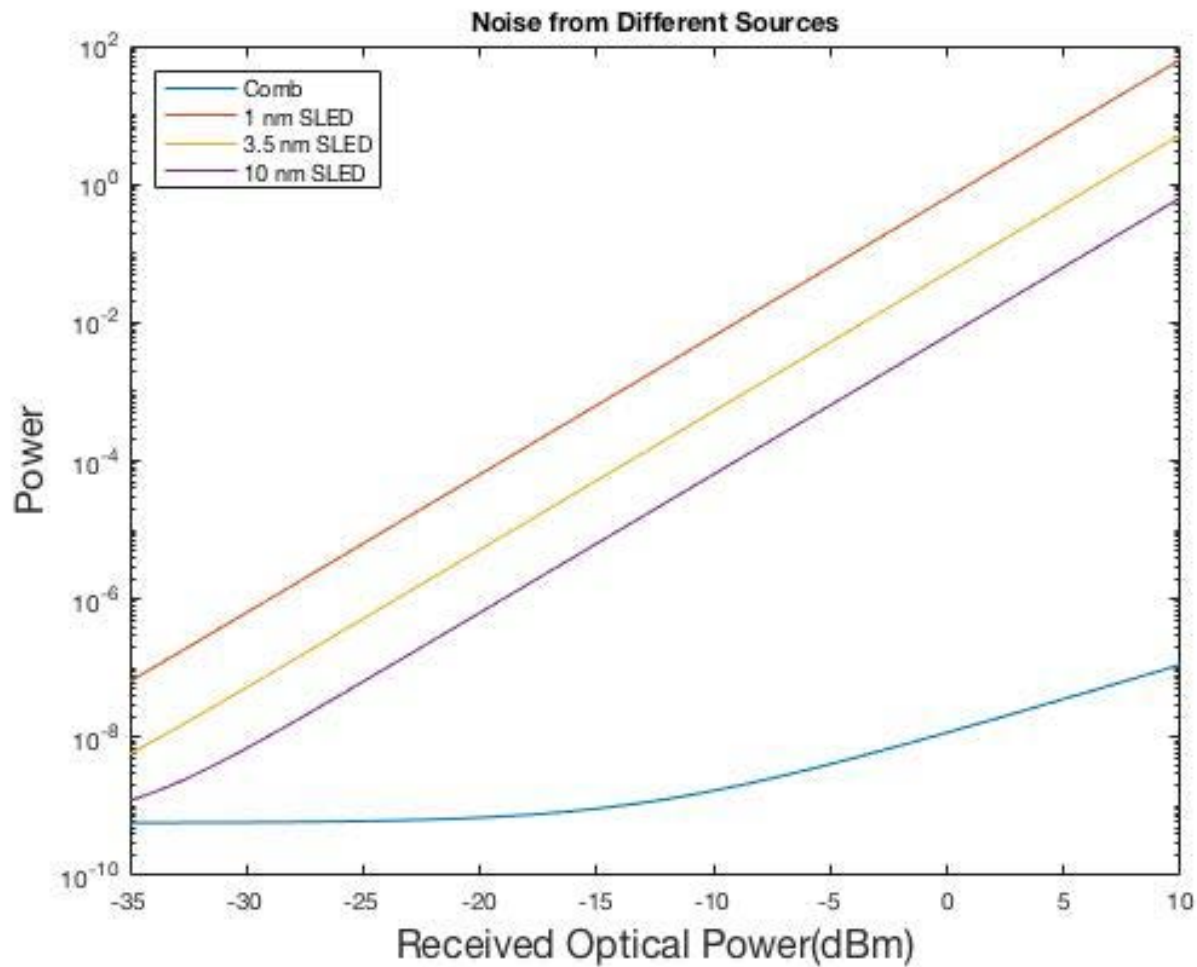


Noise and Signal of a 10 nm SLED



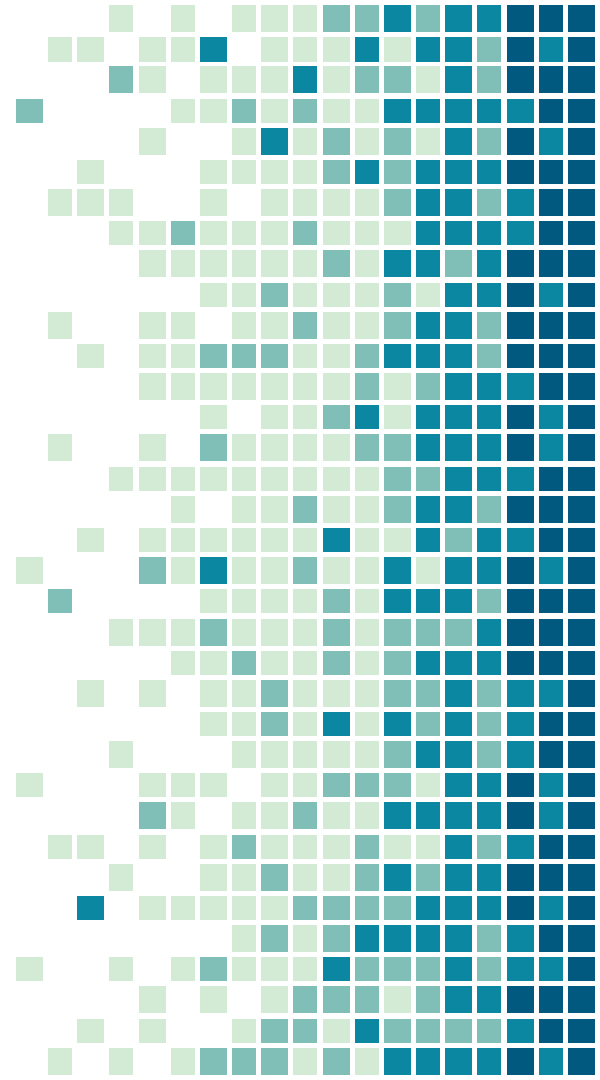
Noise and Signal of a Comb



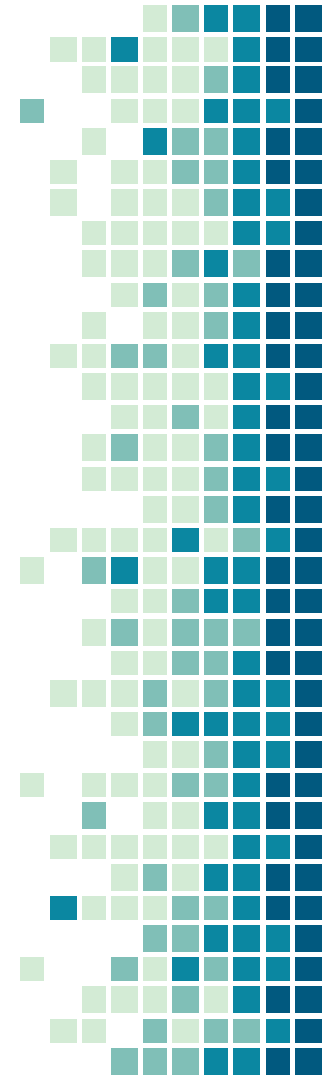
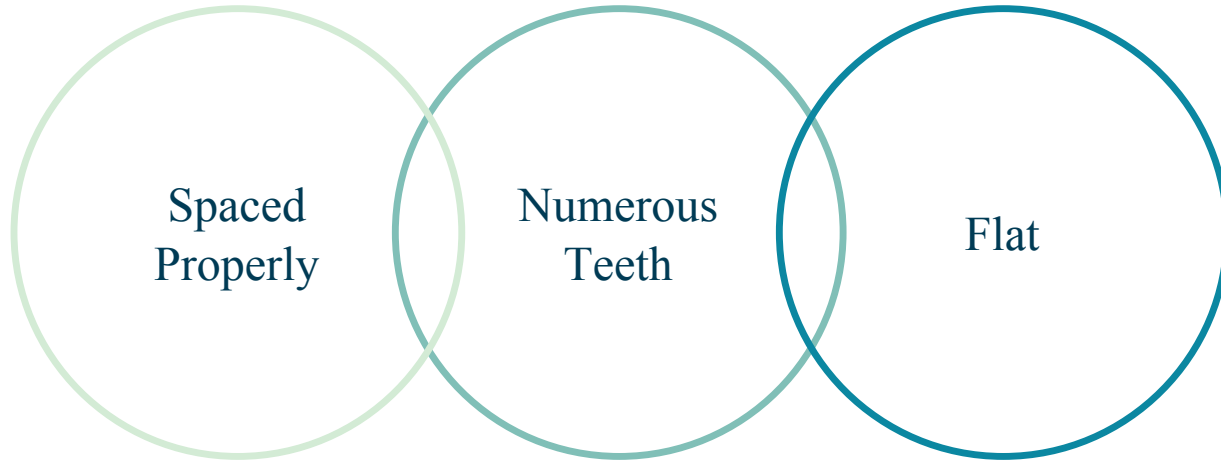


3. Generation of the Comb

How many combs, and how do they need
to be spaced?

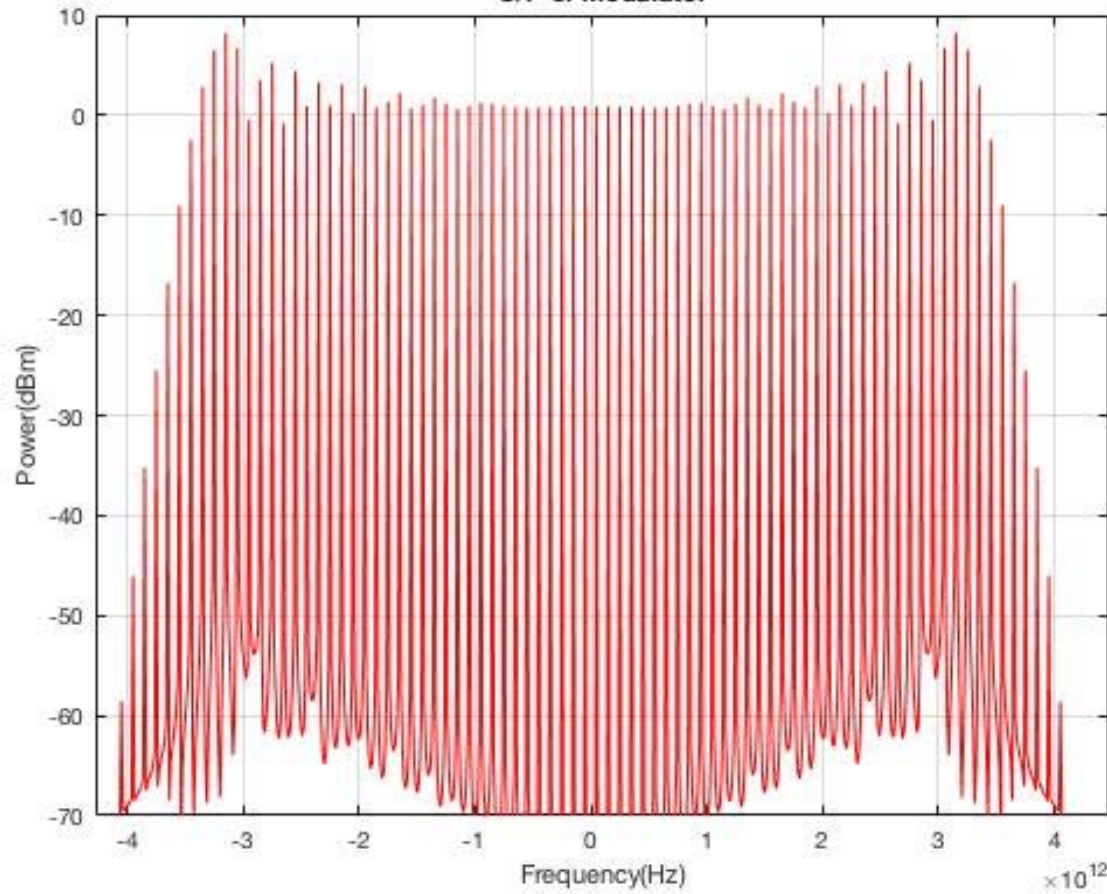


Comb Necessities

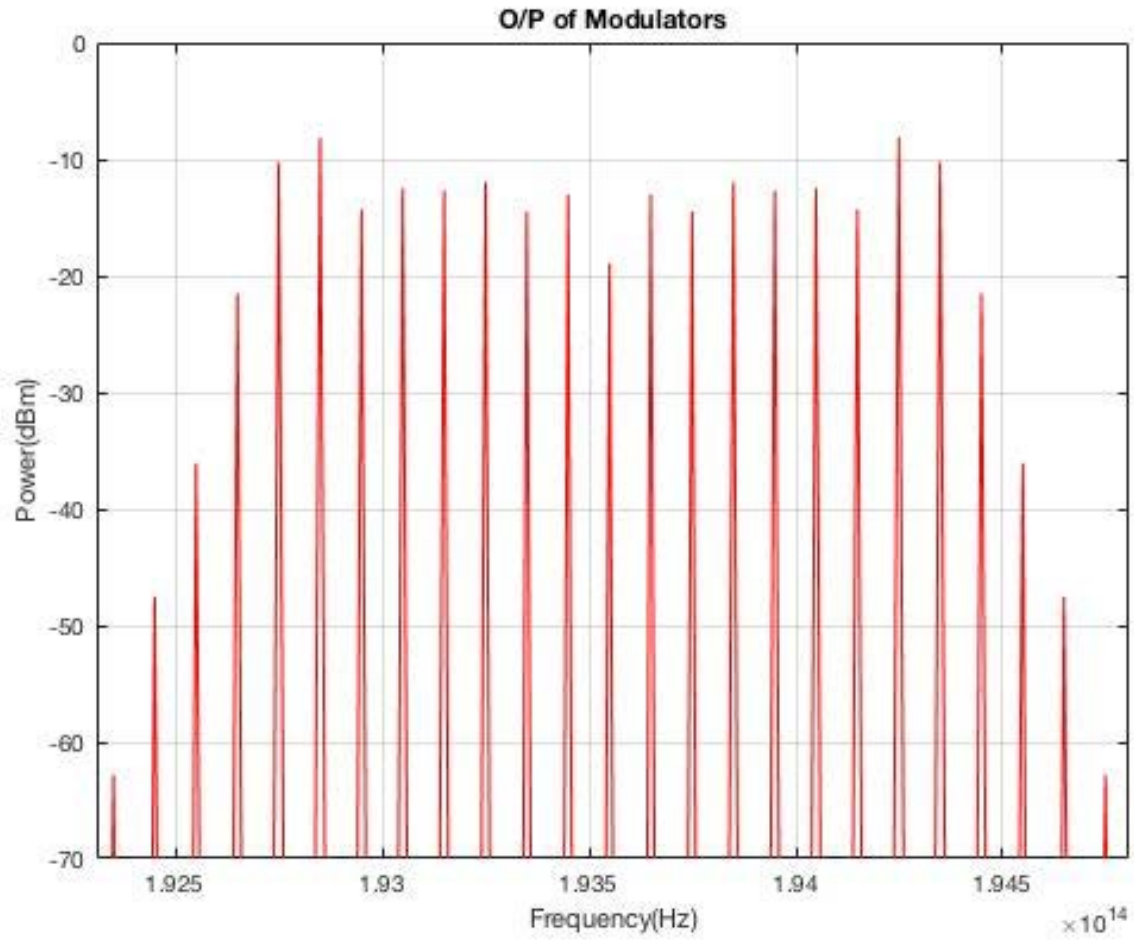


O/P of Modulator

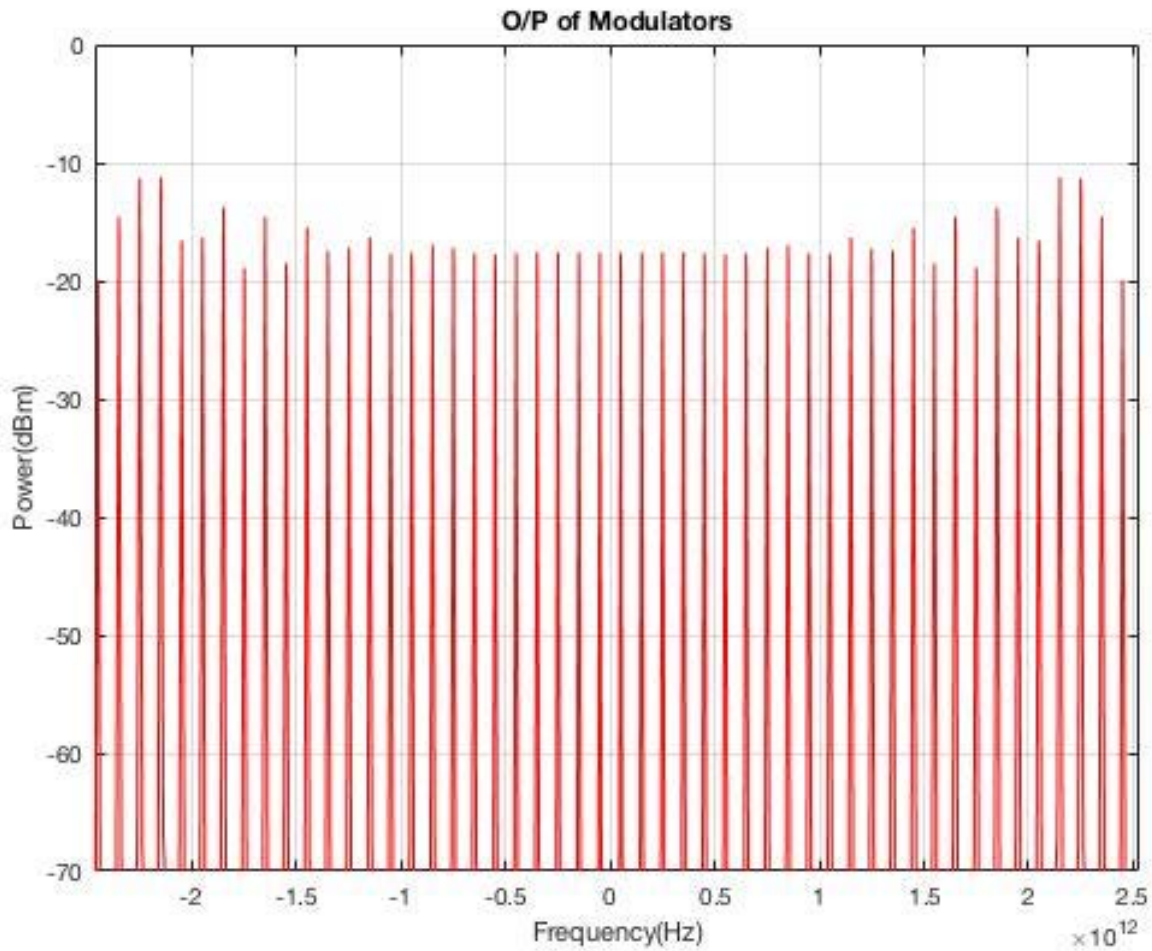
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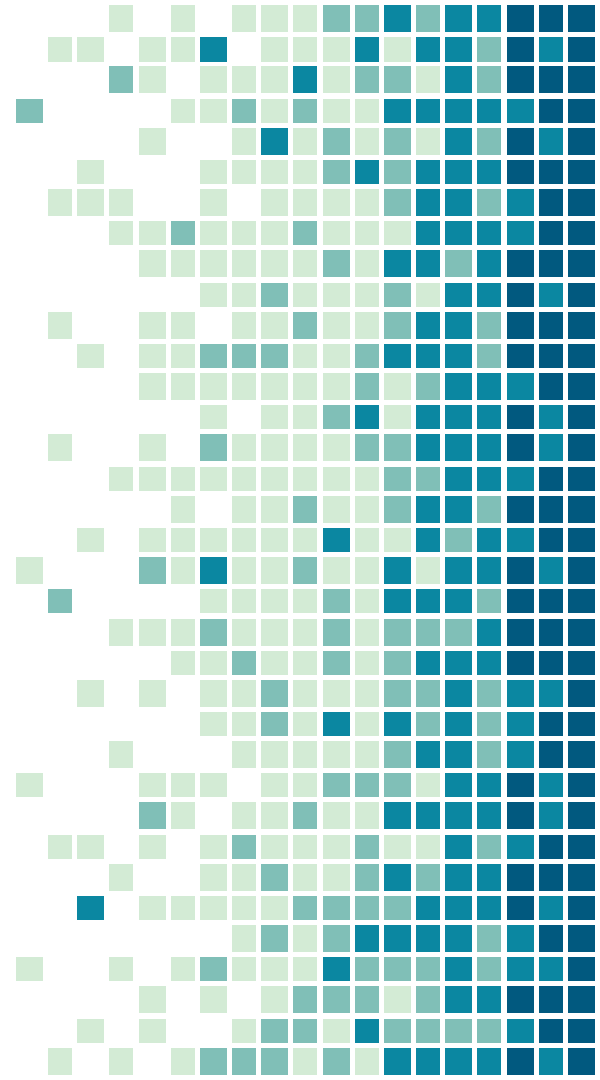
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4.

Wavelength Division Multiplexing

Split into channels via wavelength



Wavelength Division Multiplexing

Eliminate Crosstalk

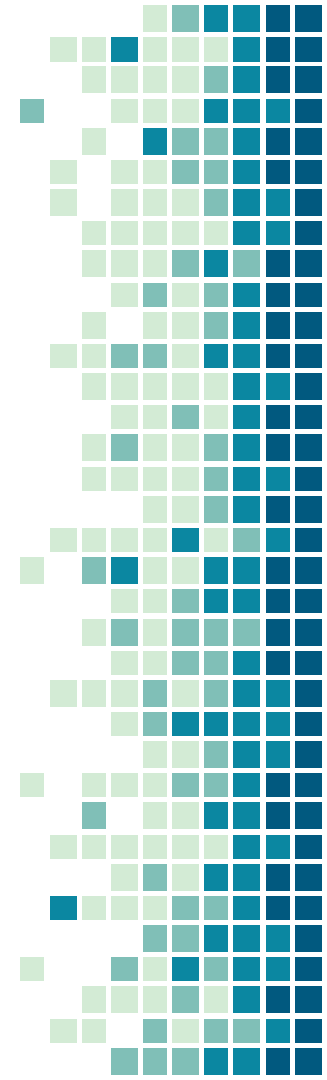
Making sure that all frequencies that are not supposed to be in the channel are eliminated

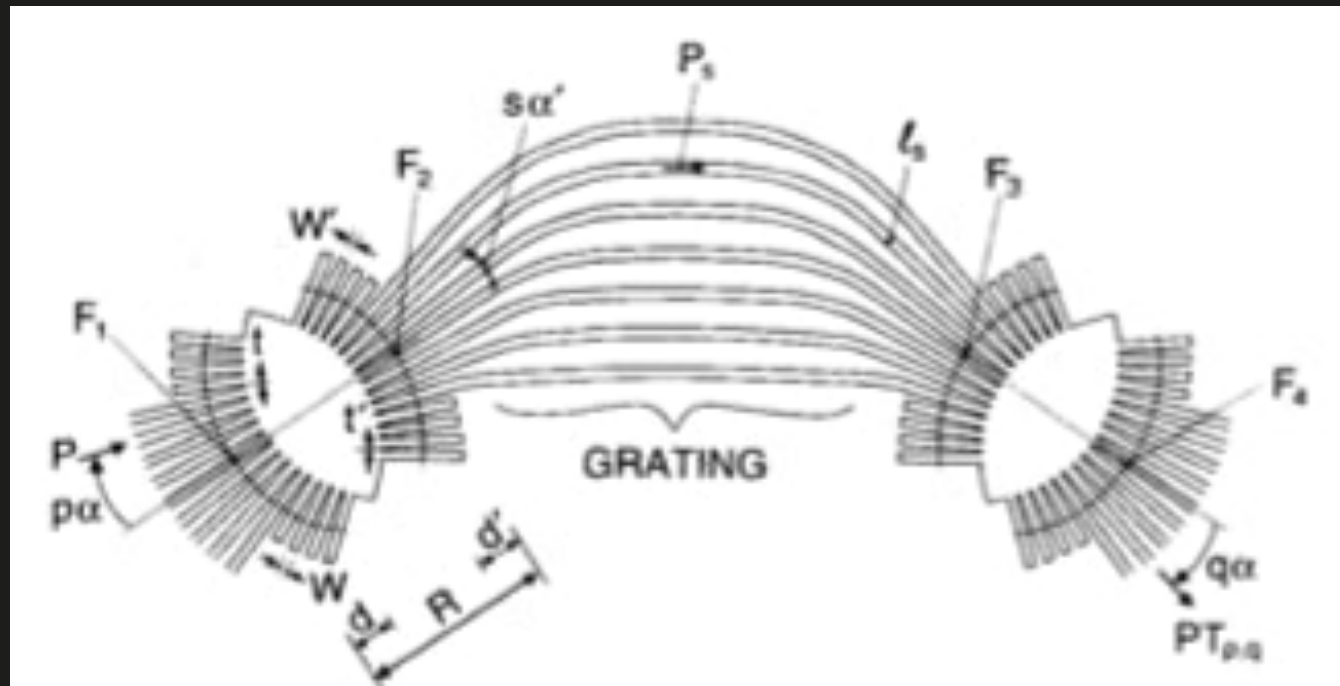
Conserve Power

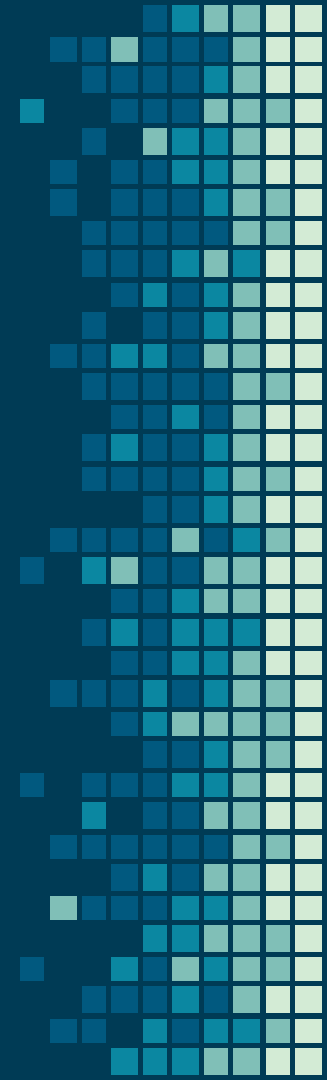
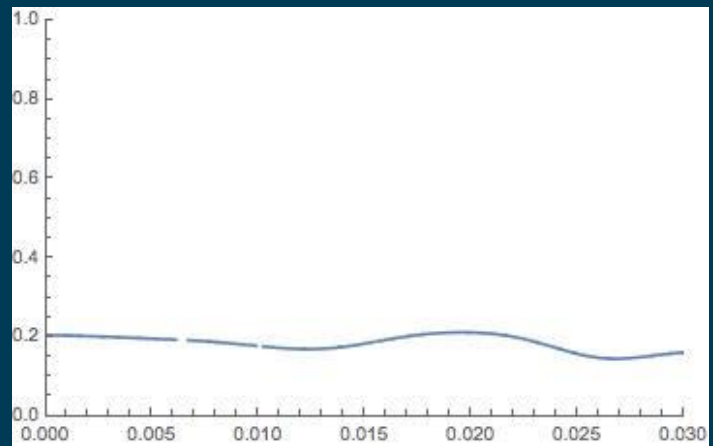
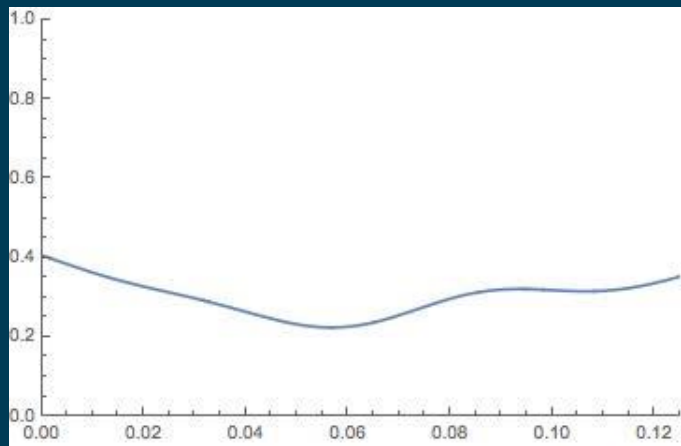
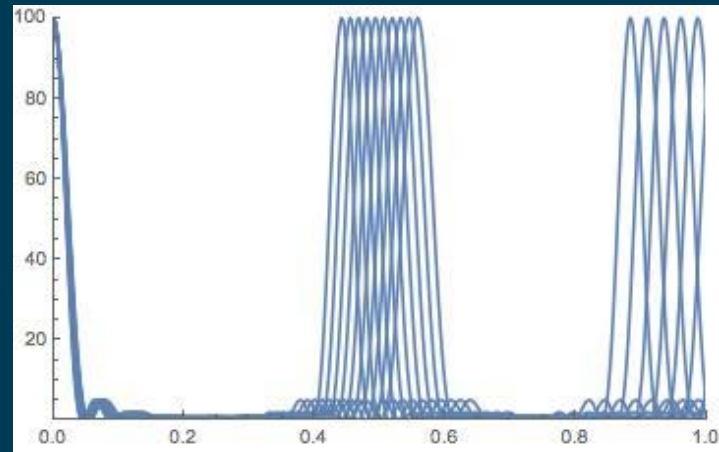
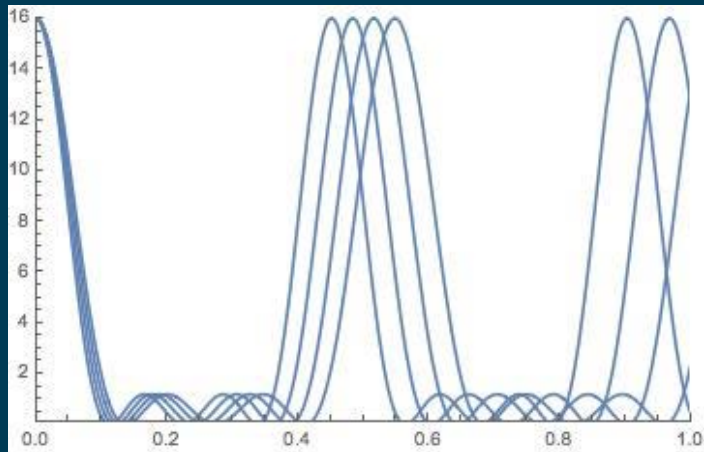
Keep all power that is input in the system.

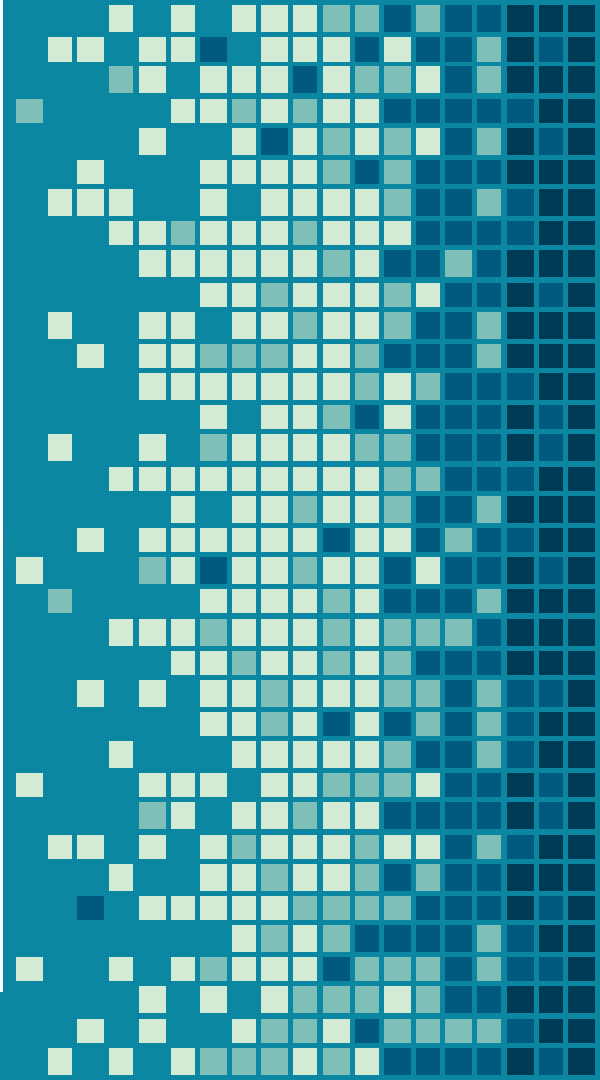
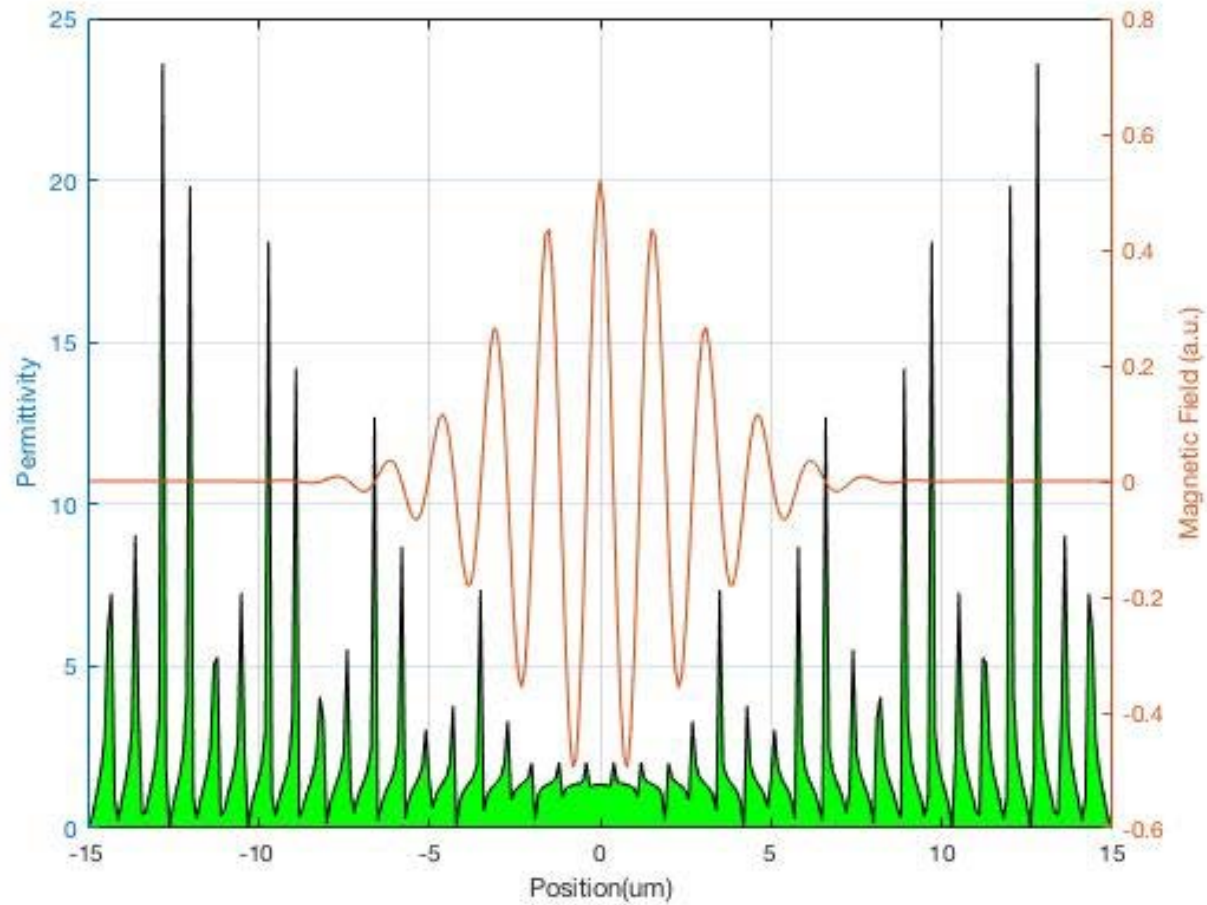
Minimize Sizing

For nanophotonics, the multiplexer is usually the largest component on chip, so minimizing it is of significant interest.

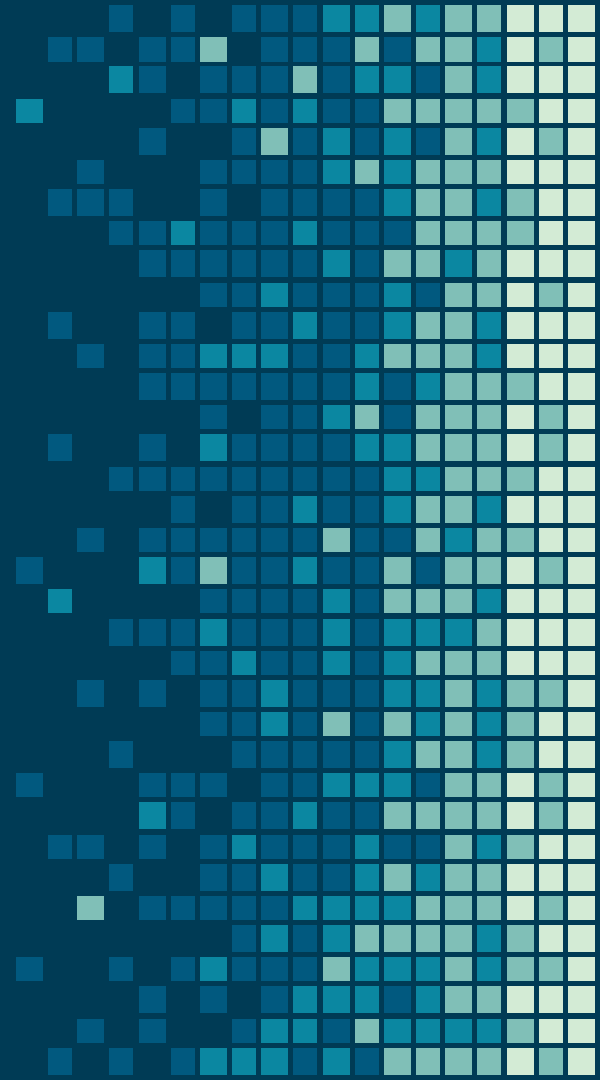








Thank You!



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