Bachelor/ Master Thesis:

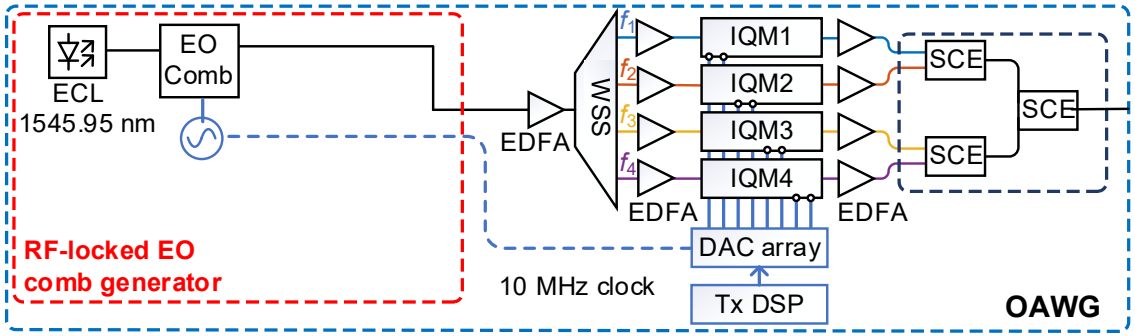
System Modeling and Performance Analysis of an Optical Arbitrary Waveform Generation (OAWG) Platform

Future optical communication and signal generation systems increasingly rely on ultra-broadband waveform synthesis to achieve higher data rates and flexible signal formats. One promising approach is Optical Arbitrary Waveform Generation (OAWG), where multiple modulated signals are coherently combined to synthesize wideband optical signals. While this technique offers great flexibility, the performance of such systems strongly depends on the detailed behavior of the optical components involved, including amplifiers, modulators, filters, and comb sources.

To efficiently design and optimize OAWG systems, accurate system-level modeling is essential. In particular, understanding how optical power levels, noise figure, amplifier gain, insertion losses, and nonlinear effects is crucial to predict signal quality and performance limitations.
The goal of this master's thesis is to develop the foundation for a simulation framework of an OAWG system that models the power and noise evolution along the optical signal chain. The model should include key components such as comb sources, IQ modulators, optical amplifiers, combiners, and receivers.

Your tasks:

- Implement Python or MATLAB simulations for parts of the signal chain
- Verify the simulation on existing lab measurements



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