Title: Apodized Coupled Resonator Optical Waveguides: Theory, design and characterization.
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Abstract in English

In this thesis we propose the apodization or windowing of the coupling coefficients of the unit cells conforming a coupled resonator device as a mean to improve the spectral response of these filters. In the same way, we have developed a synthesis algorithm for CROW devices, that given an objective response yields the coupling constants for every resonator within the array.
We also have introduced a novel technique for the apodization of coupled resonator structures by applying a longitudinal offset between resonators in order to set the appropriate power coupling constant for obtaining a targeted response, which alleviates the technical requirements required for the production of these devices.
We have demonstrated the design, fabrication and characterization of CROW structures employing the apodization through the aforementioned technique in Silicon-On-Insulator technology and validated the theoretical predictions. Lastly, we have explored the delay and phase characteristics of CROW devices and introduced a novel architecture for microwave signal processing in beamforming networks employing resonators as phase-shifting sections.