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Manipulation of extinction features in frequency combs through the usage of graphene

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Abstract: Lately, the integration of bidimensional materials into semiconductor devices has allowed the modification of their effective index by simply applying a modest voltage (between 0 and 2 volts). In this work, we present a device composed of two evanescently coupled silicon microring resonators where both rings have a graphene layer on top. This design is aimed to produce frequency combs with transmission characteristics controlled upon voltage application to the graphene layer. We numerically analyze the device response as a function of the incident wavelength and applied voltage. The results showed a low power consumption (0.6 GW/cm^2), rapid response time ($0.1 \mu\text{s}$) and broadband operation, in comparison to devices controlled by heat injection.

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