



Optical Isolation Can Occur in Linear and Passive Silicon Photonic Structures

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On-chip optical isolators play a key role in optical communications and computing based on silicon integrated photonic structures. Recently there have raised great attentions and hot controversies upon isolation of light via linear and passive photonic structures. Here we analyze the optical isolation properties of a silicon photonic crystal slab heterojunction diode by comparing the forward transmissivity and round-trip reflectivity of in-plane infrared light across the structure. The round-trip reflectivity is much smaller than the forward transmissivity, justifying good isolation. The considerable effective nonreciprocal transport of in-plane signal light in the linear and passive silicon optical diode is attributed to the information dissipation and selective modal conversion in the multiple-channel structure and has no conflict with reciprocal principle.

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