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[25] Hybrid III-V/Silicon photonics

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Our modern interconnected society is built upon two foundational technologies; the compute power of silicon CMOS and the capability of photonics for transmitting vast amounts of data in telecommunication networks. The seamless integration of silicon electronics and III-V photonics has been a long-standing goal to merge these two worlds on a single chip. There's interest in combining passive silicon waveguides with other materials in hybrid devices and systems. Here, I will cover the work done at IBM research on developing novel epitaxial techniques for the monolithic integration of III-Vs on Si. I will focus on waveguide coupled high-speed III-V photodetectors, where we explore inverse design optimization together with DTU, and on hybrid III-V/Silicon photonic crystal lasers based on topological designs.

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