

# InP-on-Silicon Integration Through Waferbonding and Epitaxy

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Silicon Photonics is rapidly evolving to a mature platform for realizing complex Photonic ICs and several companies are currently introducing first commercial products based on this platform. However the platform is missing a natural light source. In this talk I will discuss two approaches for overcoming this issue. Using wafer bonding high quality epitaxial layers can be directly integrated on the silicon circuits. Following a decade of research this technology now allows to realize device that can compete and in some cases even outperform standard InP-based telecom devices. I will introduce the basics of this III-V on silicon platform and present some new developments. A second and much more exploratory approach is the direct epitaxial growth of III-V materials on silicon substrates. We recently demonstrated InP and InP/InGaAs DFB lasers directly grown on silicon. I will present these results together with other recent results from literature.

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# **Integration of Si and SiN PICs with New Active Materials**

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In this presentation we will report on our recent work on new materials that can be monolithically integrated on high-index contrast silicon or silicon nitride photonic ICs to enhance their functionality. This includes graphene and other 2D-materials for realizing compact electro-absorption modulators and non-linear devices, ferroelectric materials for realizing phase modulators and colloidal quantumdots for lasers and integrated quantum optics devices.

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