Getting in Touch with Integrated Photonic Circuits

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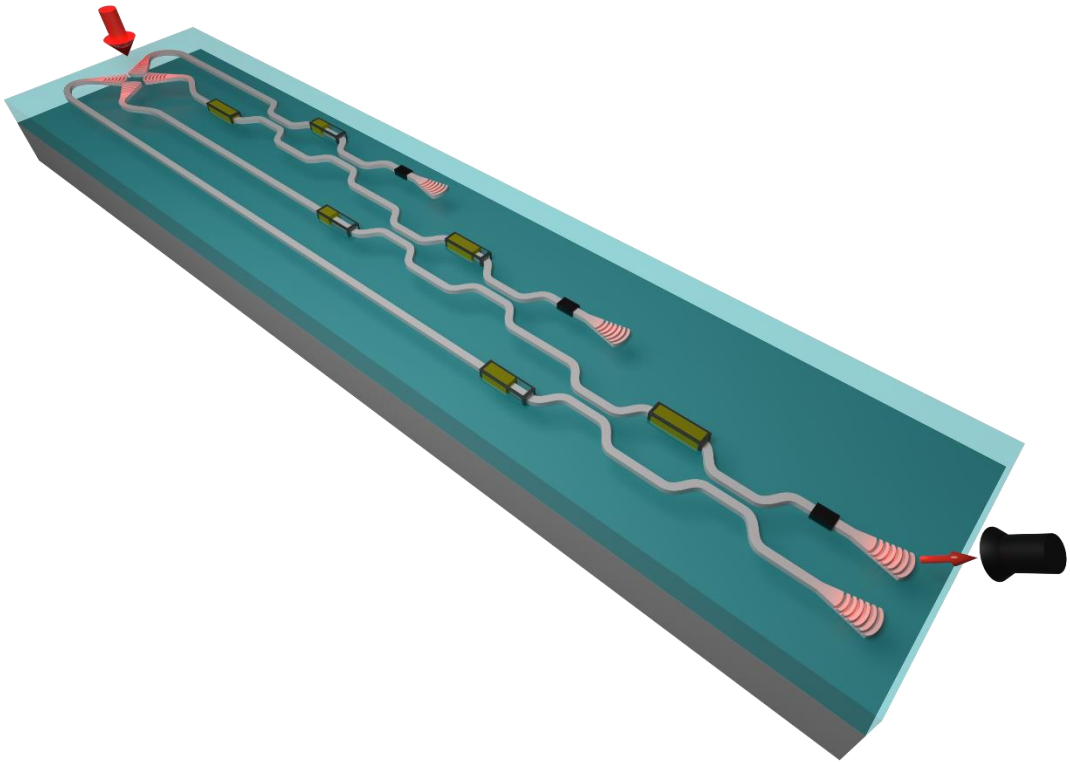
The integration of optical setups into photonic integrated circuits (PICs) has proven to be advantageous for many applications. Bulky, complex and hard to align setups with many components can often be replaced by a single photonic chip. PICs which can be programmed during run-time to perform different tasks are of particular interest, since they are not limited to one specific application alone [1]. Such circuits are often based on meshes of reconfigurable Mach-Zehnder interferometers (MZIs) which actively process light across the chip. Here, an individual on-chip MZI will be discussed in detail to understand how it acts on, and what insights it might yield into the light within a chip. Based on this building block we will then, step by step, build and discuss more complex reconfigurable PICs and their different applications. Lastly, we will focus on the use of such devices as spatially resolving detectors for amplitude and phase of light and go into detail about specific applications for such novel measurements [2,3].



[1] Bogaerts, W., Pérez, D., Capmany, J., Miller, D. A., Poon, J., Englund, D., ... & Melloni, A., *Nature*, 586(7828), 207-216, 2020

[2] Woźniak, P., Banzer, P., & Leuchs, G., *Laser & Photonics Reviews*, 9(2), 231-240, 2015

[3] Bütow, J., Eismann, J. S., Milanizadeh, M., Morichetti, F., Melloni, A., … & Banzer, P., *arXiv:2204.09284*, Submitted