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Integrated photonics for trapped ion quantum computing

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Trapped ions are one of the most promising platforms in the field of quantum computing and simulation. Technology nowadays offers incredible tools to trap and manipulate individual particles down to the quantum level, but the current state of the art allows to maintain control of these systems only up to a certain size. One of the most pressing roadblocks to overcome is to make laser beam delivery scalable and efficient

On the other hand, integrated photonics is an established and powerful tool for manipulating laser light. Miniaturized optical elements can be precisely manufactured and replicated to scale, allowing control of light that wouldn't be possible with traditional bench-top free-space optics.

In this talk, I will introduce the current efforts to bridge these two technologies. Ion trapping experiments can take advantage of photonics for efficient addressing of ions with laser light, shaping light beams in order to tailor atom-light interactions, and integrating photonic structures directly in the trap as a way to scale from lab experiments to the next generation's computers.

Abstract category

Quantum Computing

Primary author: MORDINI, Carmelo (ETH Zurich - Institute for Quantum Electronics)

Presenter: MORDINI, Carmelo (ETH Zurich - Institute for Quantum Electronics)