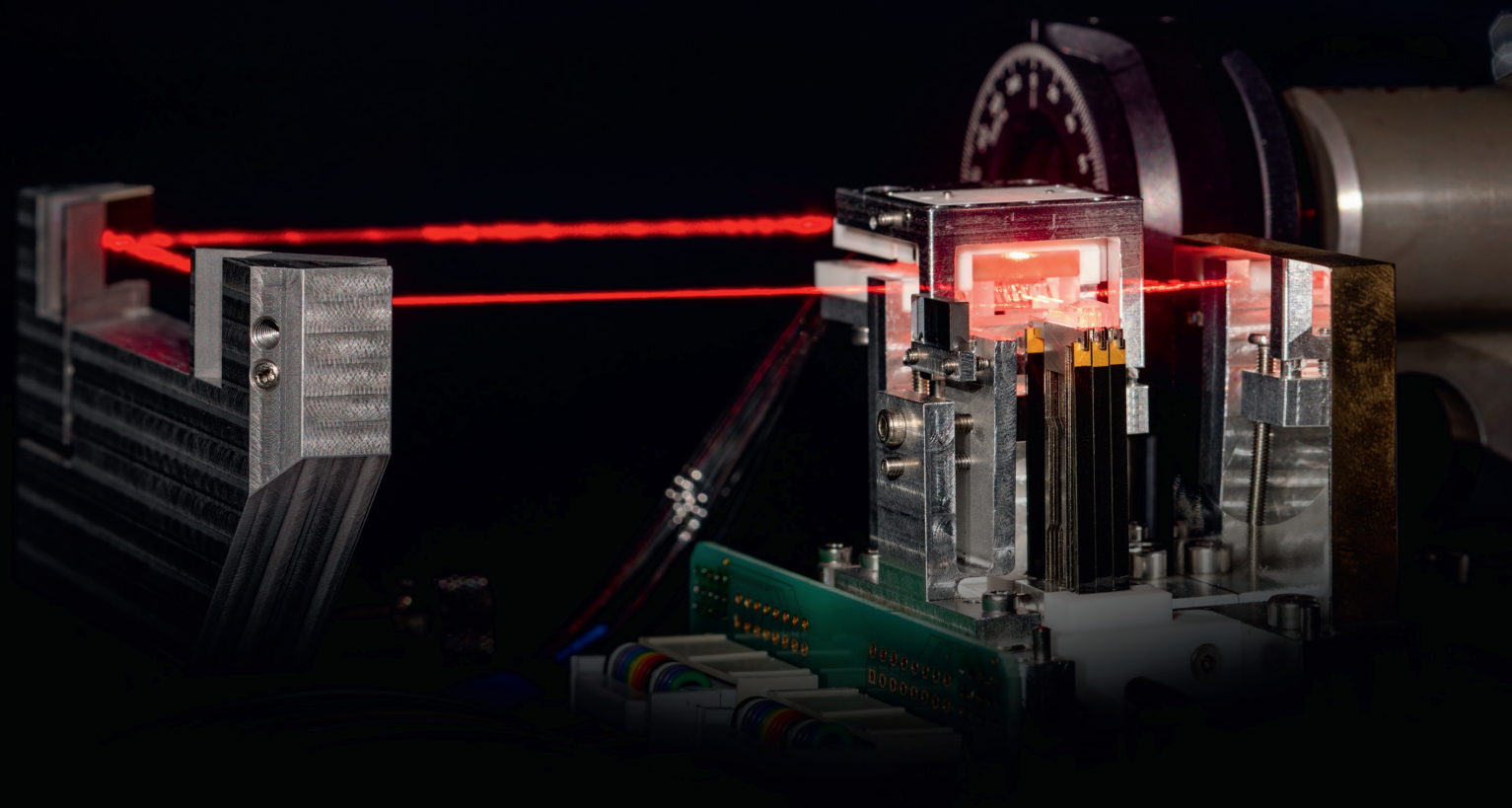
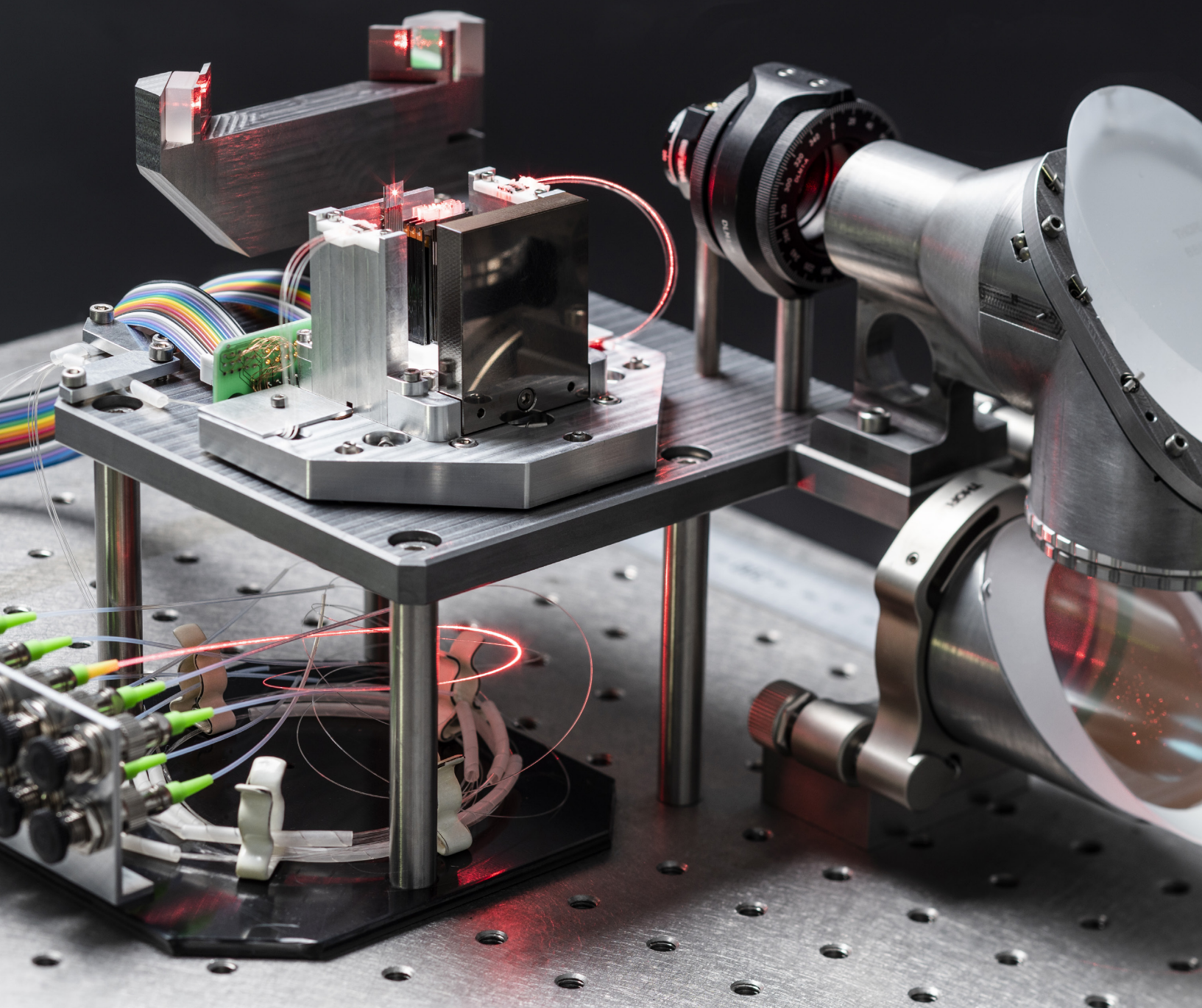




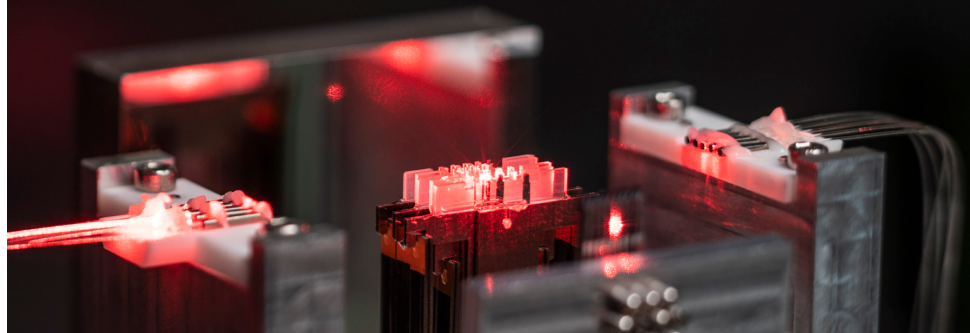
Laser addressing optics for quantum computers

The complete setup can be integrated externally using available bulk optics, or inside an ion or atom lattice trap system – including specifically designed micro-optical elements, and vacuum-compatible packaging technologies.



Enabling technologies for quantum computers

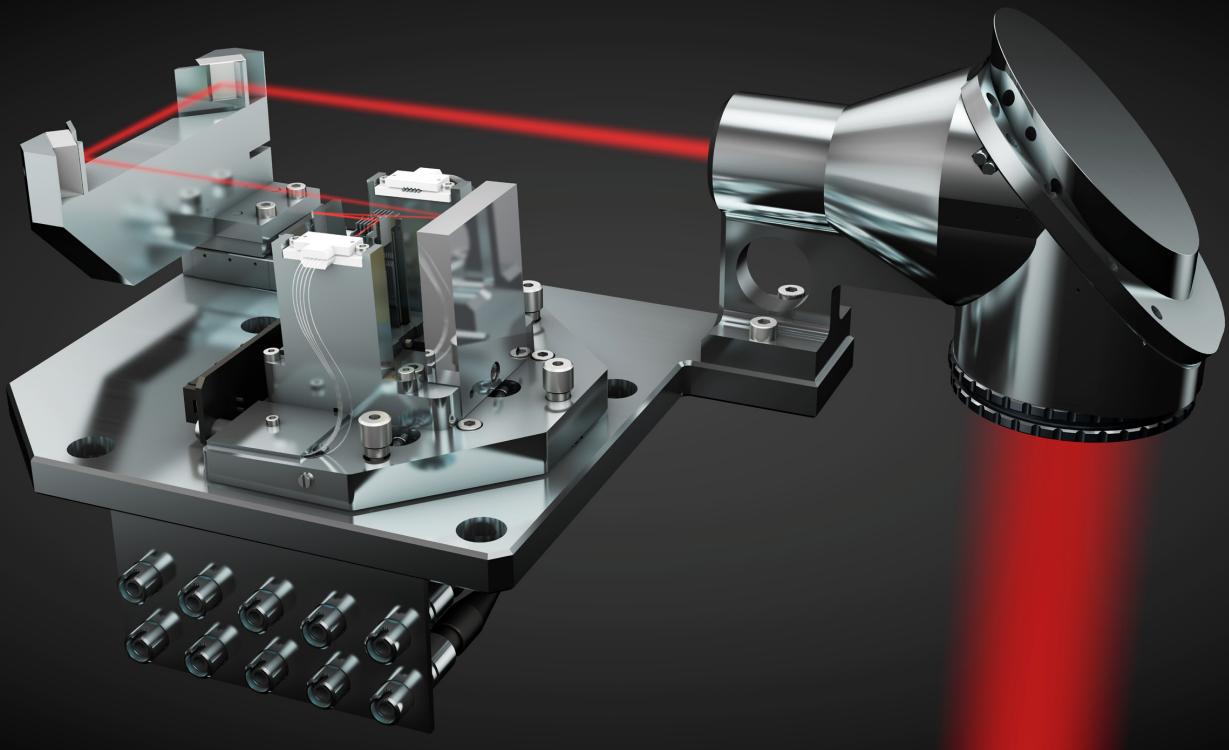
Laser addressing optics allow the control, preparation, and readout of individual ions or atoms inside a trap. They can be designed for various wavelengths ranging from ultraviolet to infrared light, depending on the employed ion or atom, and operation. Our units achieve focus waists of $1\text{ }\mu\text{m}$ at the trapped particle position and are designed for a crosstalk ratio of less than 10^{-5} with particle distances $<5\text{ }\mu\text{m}$.



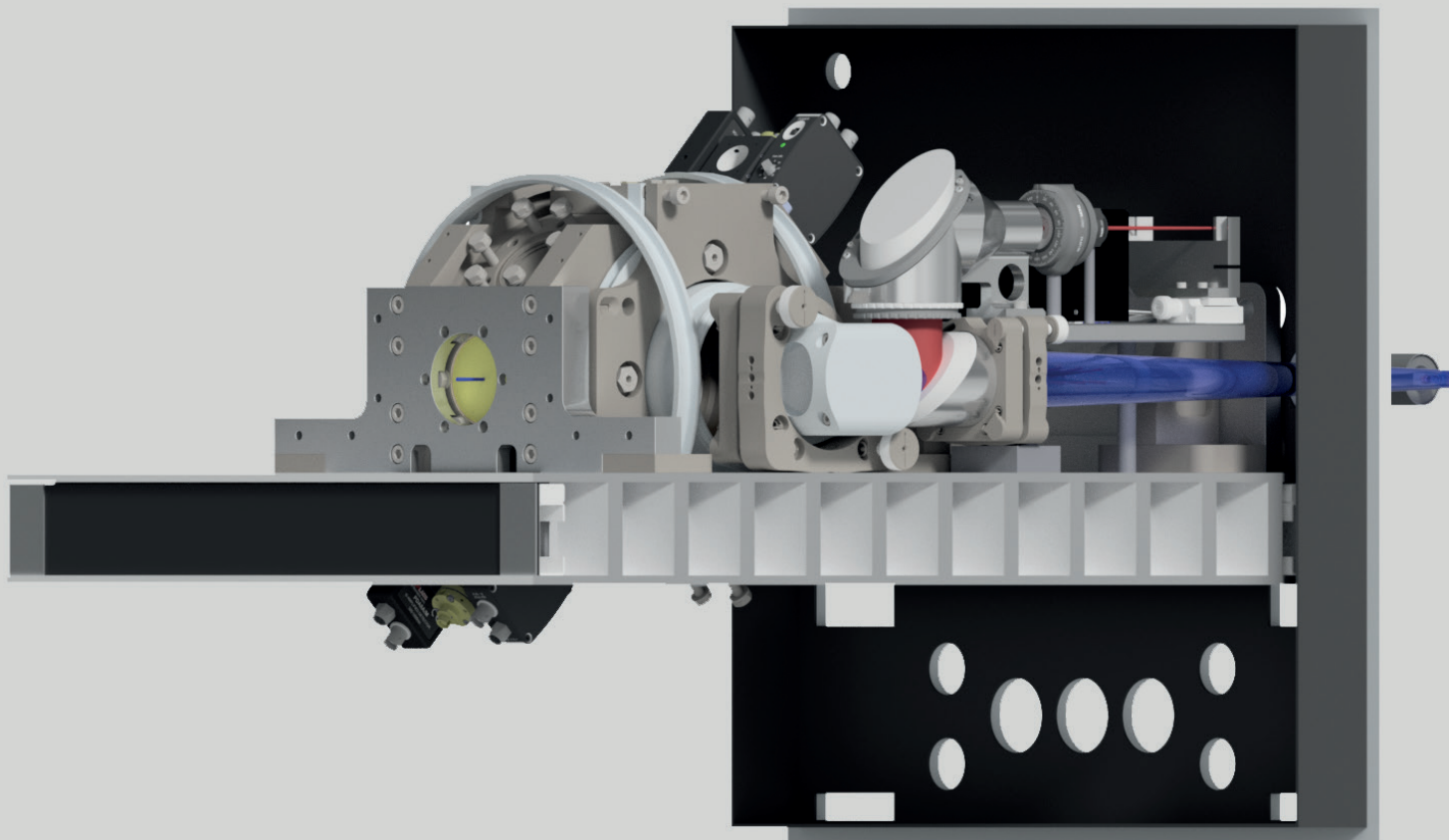
Detailed view of laser addressing optics

Waveguide chip as the core element

The core element is a trap-adapted waveguide chip that is equipped with waveguide channels according to the ion or atom positions. The waveguide chip is fiber coupled and forms a stable baseline from which particle addressing tasks can be conducted. Thanks to their small form factor of a few millimeters and lithographic manufacturing processes, waveguide chips are highly scalable, simple to integrate, and highly accurate with manufacturing tolerances in the sub-micrometer scale. An optical setup that follows the waveguide's output images and scales the laser beams down to the respective particle dimensions.



Laser addressing optics including final de-magnification into the vacuum chamber



Design of a 19" rack compatible laser addressing optics



www
more info

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