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Glass fiber-based Fabry-Pérot-Resonators with integrated ultra-thin passages

Ultra-thin glass fibers hold a great potential for light-matter interaction due to their high evanescent field intensities and have applications ranging from spectroscopy to atom traps. An ultra-thin fiber can be created by flame-heating and pulling a standard glass fiber, leading to waist diameters of a few hundred nanometers.

Building a resonator around this structure provides for the possibility of precision measurements of the taper transmission, reveals thermo-optical effects and enhances light-matter interaction within the tapered section. I will present results of resonator production, realized by applying dielectric mirrors in the form of so-called transfer coatings to the fiber end-facets, as well as results of measurements with integrated ultra-thin fiber parts.

In addition, a multi-mode fiber resonator can be used as a spatial mode filter to create higher order fiber modes. These higher order modes can be used in a new type of atom trap based on mode interference in ultra-thin fibers. The results of HE21-mode production will be presented and analyzed.

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