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Integrating Fiber Cavities and Ion Traps TRACY NORTHUP, BIRGIT BRANDSTÄTTER, ANDREAS STUTE, MAXIMILIAN HARLANDER, U. Innsbruck, PIET O. SCHMIDT, PTB and Leibniz University Hannover, RAINER BLATT, U. Innsbruck and IQOQI — Trapping ions within fiber-based cavities offers several advantages for quantum computing. First, the fiber-coupled output mode of the cavities suggests the possibility of integrating multiple systems within a quantum network. Additionally, the small mode volume of such a system would allow us to reach the strong coupling regime of cavity QED, not yet achieved with single ions. We outline our efforts to access this regime with a new experiment using fiber-based mirrors, developed in collaboration with J. Reichel at ENS. We present results from measurements in which we approach trapped ions with an optical fiber in order to explore the effects of surface charges, and we discuss our characterization of high-finesse fiber cavities and plans for integration within a miniature Paul trap.

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