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## Laser-cooled atoms in fiber-integrated cavities

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Hollow-core photonic-crystal fibers (HCPCFs) loaded with atomic ensembles have been used in the past for demonstrations of strong optical nonlinearities arising from the tight transverse confinement of both photons and atoms. Integrating high-finesse optical resonators into HCPCFs would further enhance these nonlinearities and enable implementation of a variety of novel photonic devices, such as unconventional light sources and all-optical transistors controlled by single photons.

Here, we describe our recent experimental progress in development of such resonators, in particular using photonic-crystal membranes acting as dielectric metasurface mirrors, and the perspectives of loading lasercooled atoms into these resonators.

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