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**Use of buffer gas to reduce the decoherence of Rb atoms in hollow-core photonic bandgap fibers** AMAR BHAGWAT, AARON SLEPKOV, VIVEK VENKATARAMAN, PABLO LONDERO, ALEXANDER GAETA, Cornell University — Rapid advances have been made recently in the generation and use of Rb vapor inside hollow-core photonic bandgap fibers (HCPBF) for performing low-light-level nonlinear optics. Using light-induced atomic desorption, we generate significant Rb-vapor densities inside the HCPBF. The strong decoherence associated with collisions of the atoms with the core walls and the large transit-time broadening represent major challenges for applications based on sensitive quantum optical phenomena. Introduction of buffer gases impedes the motion of Rb atoms across the beam resulting in a decreased rate of collisions with the walls and a reduction in transit-time broadening. We investigate the effects of Ne on the desorbed Rb atoms and demonstrate enhanced optical pumping between the Rb-87 ground states in the presence of the buffer gas.

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