

Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Microring Resonators on a Suspended Membrane Circuit for AtomLight Interactions¹ TZU-HAN CHANG, BRIAN FIELDS, Purdue University, MAY KIM, National Institute of Standards and Technology, XINCHAO ZHOU, CHEN-LUNG HUNG, Purdue University — Atoms that are trapped and interfaced with light in nanophotonic circuits form an exciting new platform for applications and fundamental research in quantum optics and many-body physics. The ability to induce tunable long-range atom-atom interactions with photons, and the formation of an organized atomnanophotonic hybrid lattice presents a novel opportunity to explore collective quantum optics and many-body physics. Our system is based on high quality silicon nitride microring resonators fabricated on a transparent membrane substrate. This platform is compatible with laser cooling and trapping with cold atoms and with potentially high cooperativity parameters $C \approx 500$, thus holding great promises as an on-chip atom cavity QED platform. We present our on-going experiment effort for coupling atoms to a micro-ring and further fabrication improvements for quality factor for creating strong atom-photon coupling.

¹AFOSR YIP (Grant NO. FA9550-17-1-0298)

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Date submitted: 31 Jan 2020

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