

Abstract Submitted  
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**Nanophotonic cavity QED with multiple trapped atoms** TAMARA DORDEVIC, POLNOP SAMUTPRAPHOOT, CRYSTAL SENKO, SYLVAIN SCHWARTZ, Harvard University, Department of Physics, VLADAN VULETIC, MIT, Department of Physics and Research Laboratory of Electronics, MIKHAIL LUKIN, Harvard University, Department of Physics — Realization of coherent atom interactions mediated by photons in optical cavity QED has been a long-standing goal in AMO physics. We present a new method for trapping and cooling two atoms near a nanophotonic cavity [1], and describe our progress towards preparing an entangled state of two atoms mediated by the cavity photons. Our approach can be extended to realizing an efficient quantum state transfer and quantum gates [2], with applications to integrated quantum networks. [1] J. D. Thompson, T. G. Tiecke, N. P. de Leon, J. Feist, A. V. Akimov, M. Gullans, A. S. Zibrov, V. Vuletic, and M. D. Lukin, *Science* 340, 1202 (2013) [2] T. G. Tiecke, J. D. Thompson, N. P. de Leon, L. R. Liu, V. Vuletic and M. D. Lukin, *Nature* 508, 241 (2014)

Tamara Dordevic  
Harvard University, Department of Physics

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