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Atom Entanglement in Nanophotonic Cavity QED POLNOP SAMUTPRAPHOOT, THIBAULT PEYRONEL, CRYSTAL SENKO, MANUEL ENDRES, ALEXANDER KEESLING, JEFF THOMPSON, TOBIAS TIECKE, Harvard University, Department of Physics, KALI NAYAK, Center for Photonic Innovations and Department of Engineering Science, The University of Electro-Communications Tokyo, VLADAN VULETIC, MIT, Department of Physics and Research Laboratory of Electronics, MIKHAIL LUKIN, Harvard University, Department of Physics — Photons in a nanoscale photonic crystal waveguide cavity can be strongly coupled to individual trapped atoms due to the tight confinement of the optical mode. This platform enables a novel realization of an efficient atom-photon quantum interface for quantum networks [1]. We present experimental progress towards entanglement of two trapped atoms mediated by cavity photons. This approach can be used for realizing efficient quantum gates [2] with applications to integrated quantum networks and studies of many-body physics with light-mediated interactions.

[1] T. G. Tiecke, J. D. Thompson, N. P. de Leon, L. R. Liu, V. Vuletic and M. D. Lukin, Nature 508, 241 (2014)
[2] J. Borregaard, P. Kómór, E. M. Kessler, A. S. Sørensen, M. D. Lukin, arXiv:1501.00956

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