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Towards high phase space density via cavity cooling YU-TING CHEN, Department of Physics, Harvard University, Cambridge, Massachusetts 02138, USA, YIHENG DUAN, PABLO SOLANO PALMA, Department of Physics and Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, USA, MAHDI HOSSEINI, Birck Nanotechnology Center, School of Electrical and Computer Engineering, Purdue University, West Lafayette, IN 47907, USA, KRISTIN BECK, Joint Quantum Institute and University of Maryland Department of Physics, College Park, Maryland 20742, USA, VLADAN VULETIC, Department of Physics and Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, USA
— Optical cooling of atoms to achieve Bose-Einstein condensation has been recently demonstrated via degenerate Raman sideband cooling [1]. This technique is faster and more efficient than conventional evaporative cooling. However, it is challenging to implement Raman sideband cooling in atoms or molecules with complicated internal energy structures. A way to overcome this limitation is cavity cooling. Using this method, cooling many atoms down to the theoretical limit has been demonstrated with more efficiency than evaporative cooling [2]. Remarkably, cavity cooling is independent of the internal atomic structure. These advantages make cavity cooling a potential technique to generate Bose Einstein condensates that can be applied to many different atomic species. In this work, we report our experimental progress towards reaching high phase space density via cavity cooling. [1] Science 358, 1078-1080 (2017) [2] Phys. Rev. Lett. 118, 183601 (2017)

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