

Abstract Submitted  
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**Fast production of large sodium Bose-Einstein condensates**<sup>1</sup> JAE-YOON CHOI, Seoul National University, MYOUNG-SUN HEO<sup>2</sup>, Massachusetts Institute of Technology, WOO JIN KWON, YONG-IL SHIN<sup>3</sup>, Seoul National University, QUANTUM GAS LABORATORY TEAM — We have realized Bose-Einstein condensates (BEC) of sodium atoms in an optically plugged magnetic quadrupole trap. Our BEC machine employs a zero-crossing Zeeman slower to provide a high atom flux and a magnetic quadrupole, linear trap for fast rethermalization during evaporation cooling. The Majorana nonadiabatic spin-flip loss, which is the major defect of a quadrupole trap, was suppressed by superposing a repulsive optical potential at the magnetic trap center. A large pure condensate of 10 million atoms was produced in every 17 s. We have obtained quantitative understanding of the fast and efficient evaporation by investigating the heating and loss effects of the Majorana spin-flip and the optical plug. A simple model will be presented to describe the evaporation dynamics in the plugged quadrupole trap.

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