Realization of large $^7\text{Li}$ Bose-Einstein condensates using gray molasses

KYUNGTAE KIM, SEUNGJUNG HUH, KIRYANG KWON, JAE-YOON CHOI, Department of Physics, Korea Advanced Institute of Science and Technology, Daejeon 34141, Korea, LI-7 TEAM TEAM — The ultracold $^7\text{Li}$ atoms are a good candidate for studying non-equilibrium phenomena by means of relatively light mass and the broad Feshbach resonance. In this poster, we report an apparatus that produces Bose-Einstein condensates with $2.7 \times 10^6$ atoms in 11s. To have rapid evaporation cooling in a magnetic trap, we adopt $D_1$ gray molasses [1] that cools atoms trapped in a magneto-optical trap to $25\mu$K. Run-away evaporation cooling is achieved in a plugged quadrupole magnetic trap, where the Majorana atom loss is fully suppressed by a repulsive optical barrier. The BECs are obtained in a crossed-optical dipole potential by evaporation near the Feshbach resonance. For efficient evaporation, we apply a vertical field gradient, tilting the optical potential to reduce potential depth [2].
