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Bose-Einstein condensate with widely tunable atom number ALINA PINEIRO ESCALERA, GRAHAM REID, MINGWU LU, AMILSON FRITSCH, IAN SPIELMAN, Joint Quantum Institute, National Institute of Standards and Technology, and University of Maryland — The diverse array of ultracold atomic experiments naturally require Bose-Einstein condensates (BECs) and degenerate Fermi gases with atom number differing by orders of magnitude. Some experiments benefit from monstrous BECs to sympathetically cool Fermi gases, while 3d lattice experiments often require tiny BECs. We deterministically and stably produce both large or small BECs using a tunable mixture of magnetically sensitive and insensitive states. By using magnetic field gradients to drive evaporation, we eject all of the magnetically sensitive atoms leaving behind pure BECs in the magnetically insensitive state. Here we experimentally demonstrate and analyze our systems capabilities in tuning the atom number and stability of the condensate.

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