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Density Profiles of ^{85}Rb–^{87}Rb Binary Mixtures[1] LAURA HALMO, ALISON LOTA, MARK EDWARDS, Georgia Southern University, SCOTT PAPP, DEBORAH JIN, JILA — We have studied the density distribution of binary mixtures of ^{87}Rb and ^{85}Rb Bose–Einstein condensates under conditions similar to a recent experiment conducted in the Jin Group at JILA. In this experiment, a binary mixture of the two Rb isotopes were confined in a magnetic trap and rf evaporative cooling was carried out on the ^{87}Rb causing sympathetic cooling of the ^{85}Rb. This mixture was then transferred to an optical trap to minimize ^{85}Rb 3–body loss and condensation was achieved by slowly decreasing the depth of the optical trap. An external magnetic field using a Feshbach resonance enabled tuning of the 85–85 scattering length. Density profiles were obtained by taking absorption images of expanded condensates after releasing them from the trap. We have calculated the theoretical shape of such images by solving approximately the coupled time–dependent (TD) Gross–Pitaevskii (GP) equations. As initial states we used Thomas–Fermi approximate solutions of the time–independent GP equation and approximately solved the time–dependent Gross–Pitaevskii equation to model the expansion. We present a comparison of this calcualation with the experimental data.

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