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Initial States of BEC mixtures Produced by Cooling in the Presence of a Feshbach Resonance LAURA HALMO, Georgia Southern University, MARK EDWARDS, Georgia Southern University and NIST — We have studied the types of Bose–Einstein condensate (BEC) mixtures produced as a result of different cooling paths. These results are relevant to a recent experiment in which a mixture of ^{85}Rb and ^{87}Rb BECs was cooled in three stages: (1) optical pre–cooling, (2) evaporative cooling in a magnetic trap, and (3) evaporatively cooled in an optical trap. We assume that, upon transfer to the optical trap, the state of the mixture of thermal gases can be represented by the superposition of a small number of low–lying trap eigenstates each with high occupation. In this case, the bose field operator can be approximated as a c–number and its evolution will be governed by the nonlinear Schrödinger equation. We investigated the density profiles that resulted from different initial thermal distributions as well as non–thermal initial distributions. We also performed studies of the effect of varying the ^{85}Rb–^{85}Rb scattering length via a Feshbach resonance. We found condensate states that differ markedly from the standard Thomas–Fermi ground states of the Gross–Piteavskii equation.

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