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Modeling the Expansion of Bose–Einstein Condensate Mixtures in the Thomas–Fermi Limit[1] ALISON LOTA, LAURA HALMO, CHARLES HOLCOMBE, MARK EDWARDS, Georgia Southern University — We have studied the expansion of a mixture of ^{85}Rb–^{87}Rb Bose–Einstein condensates within the Thomas–Fermi approximation. Systems involving mixtures of Bose–Einstein condensates of different atomic species can be accurately modeled by coupled Gross–Pitaevskii equations. As for single condensates, the coupled Gross–Pitaevskii equations can be written in hydrodynamic form where each condensate is described by a density and phase. Also just as for single condensates, the hydrodynamic equations of motion for condensate mixtures reduce to classical equations of motion when their quantum pressure terms are neglected (Thomas–Fermi approximation). In this case, it is possible to find time–dependent Thomas–Fermi approximate solutions for the hydrodynamic equations of motion for mixtures. We present these equations and their solution for the particular case of a ^{85}Rb–^{87}Rb expansion that occured in a recent experiment performed in the Jin group at JILA. We also highlight interesting features that can occur because of interaction effects in the expansion of multiple–condensate mixtures.

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