Rabi Oscillations in Two-Component Bose-Einstein Condensates with a Coupling Drive

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Abstract: The Rabi oscillations in two-component Bose-Einstein condensates with a coupling drive are studied by means of a pair of bosonic operators. The coupling drive and initial phase difference will affect the amplitude and the period of the Rabi oscillations. The Rabi oscillations will vanish in the evolution of the condensate density for some special initial phase differences ($\varphi=0$ or π). Our theory provides not only an analytical framework for quantitative predictions for two-component condensates, but also gives an intuitive understanding of some mysterious features observed in experiments and numerical simulations.

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