Spikes in a Binary Mixture of Bose-Einstein Condensates

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Abstract — Here we study the ground state solution of a coupled system of nonlinear SchrAodinger equations with external trap potentials. The coupled system is a model which describes a binary mixture of Bose-Einstein condensates. Due to Feshbach resonance, the coupled system can be transformed into a singular perturbed problem with a small parameter ϵ. As the parameter ϵ goes to zero, the existence and the asymptotic behavior of ground state solutions can be proved, and spikes can be found in these ground state solutions. Furthermore, we may figure out how trap potentials affect the locations and configurations of spikes.