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Classical dynamics of the optomechanical modes of a Bose-Einstein Condensate in a ring cavity[1] WENZHOU CHEN, University of Arizona, DAN GOLDBAUM, MISHKAT BHATTACHARYA, PIERRE MEYSTRE —
We consider a Bose-Einstein condensate (BEC) interacting with two counterpropagating optical modes in a ring cavity. In contrast to a recent experiment involving a BEC in a Fabry-Perot cavity interacting with a standing wave mode [F. Brennecke et. al, Science 322, 235 (2008).] both symmetric and antisymmetric collective density side modes of the BEC are excited by the optomechanical effects of the light fields. We present a classical analysis of the system. Its steady state exhibits a rich multistable behavior including isolated domains of solutions (isolas). We also study a number of aspects of the dynamics of the system.

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