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Parametric Excitation in a Magneto-optical Trap with Modulating the Magnetic Field Gradient YONGHEE KIM, DAHYUN YUM, CHANG-IL RYOO, KIHWAN KIM, WONHO JHE, School of Physics and Center for Near-field Atom-photon Technology, Seoul National University, HEUNG-RYOUL NOH, Department of Physics, Chonnam National University — Parametric resonance is a very interesting and important mechanism in divergent systems from physics to biology. Recently, there were a lot of researches relating to the parametric excitation in the magneto-optical trap system. However, the previous investigations were executed by only modulating the cooling laser intensity. While the intensity modulation showed the limit cycle motion and Hopf-bifurcation, the magnetic field gradient modulation revealed the more interesting phenomena such as period doubling, chaos, and so on. We have studied the transition problems between two attractors in period doubling area which are much far from equilibrium and could not be understood by the method used in limit cycle motion. The magnetic field modulation methods could give quantitative comprehensions of transition problems in the non-equilibrium system that has not been studied.

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