Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Nonequilibrium Dynamics of Interacting Two Particle in Driven Cold Atomic System WONHO JHE, YONGHEE KIM, SOYOUNG SHIN, Department of Physics and Astronomy, Seoul National University, MARK DYKMAN, Department of Physics and Astronomy, Michigan State University — We investigate the nonequilibrium fluctuational dynamics in the dynamic bistable state which is based on the parametrically modulated cold atomic system. In the absence of interaction between atoms, each atom consider as a single nonlinear oscillator and its dynamics is described by the activation energy and most probable escape path. But if the interaction exit, system exhibit complicate cooperative dynamics which is hard to deal with. We simulate the interacting two particle system for the model system of the interacting many atom system. In our work, the interaction has the form $f_{ij} = -f_{sh}\mathrm{sgn}[z_i - z_j]$ which describe the effective attractive interaction called "shadow force" in magneto-optical trap. The simulation results show clear evidence that two particle correlation grows as the interaction strength increases below the certain value. This is closely related to the spontaneous symmetry breaking transition in the parametrically modulated cold atomic system.

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Date submitted: 26 Jan 2012 Electronic form version 1.4