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Spontaneous symmetry breaking in parametrically driven atomic trap and observation of its critical properties. MYOUNG-SUN HEO, YONGHEE KIM, WONHO JHE, Seoul National University, KIHWAN KIM, University of Innsbruck, HEUNG-RYOUL NOH, Chonnan National University — While critical phenomena in equilibrium systems has been well established both in theory and in experiment, experimental studies in non-equilibrium or far-from-equilibrium systems still lack of quantitative investigation and remain as challenging subjects. Recently we have reported spontaneous symmetry-breaking(SSB) in nonequilibrium atomic system produced by parametrically exciting Magneto-optical trap. This critical phenomena is considered very unique in that it has similarities with other kinds of systems such as globally coupled Ising system and Glauber spin system. Hence we have measured critical exponents relevant to this phase transition, with respect to the control parameter, the size of the system or the total number of atoms. We also have observed the occurrence of SSB as the temperature is changed by illuminating a resonant laser light. In addition as in the other researches on Glauber spin, the spectral response to external field has been investigated.

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