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Study of critical behavior of periodically driven cold atomic system MYOUNG-SUN HEO, YONGHEE KIM, WONHO JHE, Seoul National University — It is well known that the parametrically driven magneto-optically trapped atoms are occupied in the symmetric period-2 states. When the atom number increased, recently observed spontaneous symmetry breaking(SSB) of atomic population which inherently possesses the light-induced attractive interaction. In particular, this dependence seems to show a sort of critical behavior. And another interesting behavior of this system is response to the additional oscillating bias fields. This responses show the hysteresis which is very similar to magnetic system. We measure the dependence of hysteresis loop area on the rate of change of the additional bias fields. The amplitude and frequency dependence are measured and system size, or atom number dependence also measured. The results show some scaling relations. Here we have elucidated the criticality existing in the strongly driven interacting many-particle system consisted up of cold atoms from static and dynamic perspectives.

Yonghee Kim
Seoul National university

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