

Abstract Submitted
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Emergent universality at the tricritical point in a generalized Dicke model YOUJIANG XU, HAN PU, Rice Univ — We show that the second-order quantum order phase transition presented in the Dicke model in the thermodynamic limit can turn into first-order one by breaking exchange symmetry between atoms. Landau theory of phase transition predicts that the tricritical point, which is the intersection between the first-order and the second-order phase transition boundaries, has different critical behavior than the other points on the critical line. However, we find that the relation between lowest excitation energy and the atom-light entanglement entropy is universal, though the order parameter doesn't possess universal properties. We show that it is due to the separation of classical and quantum degrees of freedom in the thermodynamic limit. Finite-size corrections tell us how the separation process takes place.

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