

Abstract Submitted
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Heralded magnetism in non-Hermitian atomic systems TONY LEE, CHING-KIT CHAN, ITAMP / Harvard — Cold atoms provide the opportunity to study dissipative quantum systems with novel properties. We study the non-equilibrium phase transitions of the XY model in the presence of an imaginary field. This type of non-Hermitian spin model can be implemented with cold atoms when the up state decays into an auxiliary state instead of the down state. The non-Hermitian model is “heralded” by the absence of population in the auxiliary state. The non-Hermitian model exhibits unique behavior compared to the Hermitian model as well as the master equation. There is a sharp phase transition already for two atoms. For a long one-dimensional chain, there is a quantum phase transition from short-range order to quasi-long-range order. The ordered phase features a non-repeating spin pattern without a classical analogue. Our results can be seen experimentally with atoms in optical lattices, trapped ions, and cavity QED.

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