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Non-Hermitian magnetism and entanglement in dissipative atomic systems TONY LEE, CHING-KIT CHAN, Harvard/ITAMP, FLORENTIN REITER, Niels Bohr Institute, NIMROD MOISEYEV, Technion — Quantum phase transitions are usually studied in terms of Hermitian Hamiltonians. However, cold-atom experiments can implement non-Hermitian Hamiltonians via weak measurements. We show that the non-Hermitian XY model exhibits quantum phase transitions beyond the framework of Hermitian physics. There is a phase transition already for two atoms. In a 1D chain, the ordered phase is frustrated and has quasi-long-range order despite the absence of a continuous symmetry [1]. The non-Hermitian phase transition also has a lot more entanglement than the Hermitian one [2]. We discuss experimental implementation with trapped ions, cavity QED, and optical lattices. [1] Phys. Rev. X 4, 041001 (2014). [2] arXiv:1409.7067.

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