

Nonthermal interacting-magnon dynamics in an optically driven 2D Heisenberg antiferromagnet

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Recent theory results demonstrate a dynamical phase transition involving nonthermal magnon populations in the antiferromagnetic phase of the 2D Hubbard model upon laser driving [Walldorf et al., Phys. Rev. B 100, 121110(R) (2019)]¹. These results were obtained in a one loop non-interacting magnon theory. Here we present first steps towards a full interacting theory of this dynamical phase transition using a Dyson Maleev large spin expansion and a Boltzmann formalism to investigate the effects of magnon-magnon interactions on the dynamical phase transition. The dynamical phase transition will be more completely characterized and implications for pump-probe experiments and ultrafast materials design of strongly correlated magnetism will be discussed.

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I. BIBLIOGRAPHY

- ¹ Nicklas Walldorf, Dante M. Kennes, Jens Paaske, and Andrew J. Millis, “The antiferromagnetic phase of the Floquet-driven Hubbard model,” *Physical Review B* **100**, 121110 (2019).

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