

Abstract Submitted  
for the DAMOP17 Meeting of  
The American Physical Society

**Quantum simulation of spin polarons with dipolar superlattice gases** LUSHUAI CAO, XING DENG, XUE-TING FANG, QIAN-RU ZHU, ZHONG-KUN HU, MOE Key Laboratory of Fundamental Physical Quantities Measurement, School of physics, Huazhong university of Science and technology — Spin polarons are under hot debate as a possible mechanism for high temperature superconducting, while the direct investigation on spin polarons remains difficult. Quantum simulation manifests itself as a promising approach for the study of spin polarons. We propose a strategy to realize effective spin polarons with the dipolar superlattice quantum gases. In this scheme, the spin degree of freedom is modeled by the site occupation of the supercells, and the defect states are modeled by the non-occupation or double occupation of the supercells, giving rise to hole and doublon states. We demonstrate the simulation ability of this strategy by the dynamics of annihilation of a pair of hole and doublon by emitting spin waves.

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Date submitted: 03 Feb 2017

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