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Non-Hermitian Optical Four-Wave Mixing in Cold Atoms YUE JIANG, YEFENG MEI, YING ZUO, The Hong Kong University of Science and Technology, YANHUA ZHAI, Kennesaw State University, JENSEN LI, The Hong Kong University of Science and Technology, JIANMING WEN, Kennesaw State University, SHENGWANG DU, The Hong Kong University of Science and Technology — We report demonstration of non-Hermitian optical four-wave mixing (FWM) in cold atoms. Particularly we show that anti-Parity-Time (anti-PT) symmetry is inherent in the forward Four-Wave Mixing (FFWM) process without linear gain and loss. Different from the traditional PT/anti-PT experiments that rely on the interplay of gain and loss to exploit non-Hermitian dynamics, in this experiment, we obtain the anti-PT Hamiltonian by making use of phase mismatching and nonlinear photon-atom coupling. By tuning the nonlinear coupling strength, we observe the dynamics of anti-PT phase transition. The work was supported by the Hong Kong Research Grants Council (Project No. 16308118 and No. C6005-17G).

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