

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Abnormal Dispersion of Optical Modes in a non-Hermitian system: Feasibility and Applications** JING CHEN, RUIPENG GUO, LITING WU, School of Physics, Nankai University, Tianjin 300071, China — We analyze the dispersions of optical eigen-modes in a non-Hermitian system. We show that abnormal dispersion of optical modes can be realized by using the concept of optical parity-time symmetry. Physical significance of these effects is discussed. The feasibility in realizing these abnormal dispersions in passive systems and the connection with damped polaritons in various photonic and phononic systems are discussed. This investigation can find many attractive applications in manipulating the dynamic of coupled optical waves, if the parasite tradeoff of loss effect can be relieved by proper gain effects.

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Date submitted: 02 Nov 2015

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