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Light Stops at Exceptional Points TAMAR GOLDZAK, MIT, ALEXEI A. MAILYBAEV, Instituto Nacional de Matemtica Pura e Aplicada, NIMROD MOISEYEV, Technion - Israel Institute of Technology — Almost twenty years ago, light was slowed down to less than 10 7 of its vacuum speed in a cloud of ultracold atoms of sodium. Upon a sudden turn-off of the coupling laser, a slow light pulse can be imprinted on cold atoms such that it can be read out and converted into a photon again. In this process, the light is stopped by absorbing it and storing its shape within the atomic ensemble. Alternatively, the light can be stopped at the band edge in photonic-crystal waveguides, where the group speed vanishes. Here, we extend the phenomenon of stopped light to the new field of parity-time (P T) symmetric systems. We show that zero group speed in P T symmetric optical waveguides can be achieved if the system is prepared at an exceptional point, where two optical modes coalesce. This effect can be tuned for optical pulses in a wide range of frequencies and bandwidths, as we demonstrate in a system of coupled waveguides with gain and loss.

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