

Abstract Submitted  
for the MAR15 Meeting of  
The American Physical Society

**Unidirectional Spectral Singularities** HAMIDREZA RAMEZANI, HAO-KUN LI, YUAN WANG, XIANG ZHANG, University of California, Berkeley — We introduce a new class of spectral singularities with directional response emerging from the interplay of parity-time (PT) symmetry and Fano resonances. We show that, without breaking the reciprocity, one is able to obtain a simultaneous unidirectional lasing and unidirectional reflectionless mode. For such a mode one side reflection tends to infinity, the other side reflection becomes zero, and the transmission coefficient remains finite. These singularities emerge from the resonance trapping and delay time associated with the reflected signal residing in the gain or loss part of the parity-time symmetric cavity. In addition, we show that in the absent of loss (gain) and at threshold gain (loss), the structure still acts as a unidirectional laser (reflectionless system). In the passive-loss case our structure acts as a unidirectional perfect absorber. When the system possesses pure balanced gain, transmission and reflection from the left and right side of the system tends to infinity and we recover the conventional lasing modes.

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Date submitted: 13 Nov 2014

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