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Lasing and anti-lasing in a single cavity

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Abstract

Lasing, light amplification by stimulated emission of radiation, is a key attribute for many important applications in optical communications, medicine and defence. Conversely, anti-lasing represents the time-reversed counterpart of laser emission, where incoming radiation is coherently absorbed. Here, we experimentally realize lasing and anti-lasing at the same frequency in a single cavity using parity-time symmetry. Because of the time-reversal property, the demonstrated lasing and anti-lasing resonances share common resonant features such as identical frequency dependence, coherent in-phase response and fine spectral resolution. Lasing and anti-lasing in a single device offers a new route for light modulation with high contrast approaching the ultimate limit.

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