

Complex Bands and Topology with Coupled Lasers

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Complex coupling in periodic laser arrays leads to complex bands, where the real part corresponds to the dispersion relation of the band $w(k)$ and the imaginary part corresponds to k -dependent loss. By precisely tuning the complex coupling and the array geometry, we engineer the complex bands to generate unique topological lasing states. We demonstrate how lasing at Dirac points in a hexagonal laser lattice can lead to Klein tunnelling of coherence through a barrier, and how complex Hermitian coupling can generate artificial gauge fields and edge states. Finally, we characterize the effects of quenched disorder and hint at KT physics in coupled laser arrays.