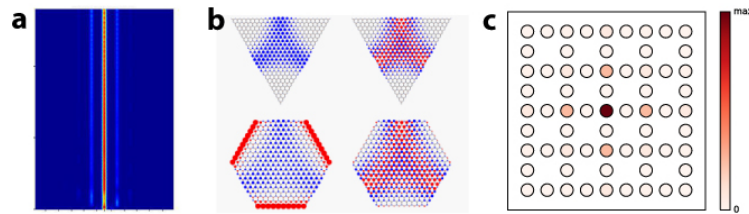# Mode selection by symmetry and topology

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Topological photonic systems : (a) Mode guiding in a quasi-one dimensional structure supporting a localised defect state. (b) Sublattice polarisation of Landau levels in strained honeycomb systems. (c) Point defect state in a dimerised Lieb lattice.

In systems with suitable symmetries, topologically protected states can arise that are immune to perturbations. I discuss how the properties of such states can be enriched in photonic systems, where one has access to absorption and amplification. In particular, I describe analogues of the chiral symmetry and the charge-conjugation symmetry and elucidate their role for the selective amplification of topological defect states. This includes the setting of point defects in one dimensional chain [1,2] and two-dimensional lattices with flat bands [3], as well as the case of the sublattice-polarised Landau level in strained honeycomb lattices [4,5].

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