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Chiral emission mediated by a giant atom in a honeycomb photonic bath.

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A giant atom is a quantum emitter that can be coupled to the field non-locally at a set of coupling points [1]. Such a new generation of emitters can nowadays be implemented in circuit QED setups, where some spectacular effects - unachievable with normal atoms - have already been observed. One of these is the possibility to enable chiral (i.e. fully uni-directional) emission upon proper engineering of coupling-point complex phases [2,3], which can have important applications for quantum communication. Here, for the first time, we investigate the emission properties of a giant atom coupled to a 2D honeycomb photonic lattice. This allows combining the intrinsically anisotropic light emission across lattices [4] with the topology of coupling points and their phase-difference pattern. Such phases can be used to control the distribution of emitted light among a set of different directions.

References:
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Abstract category

Quantum Optics

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