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Type: **Talk**

## Non-abelian Berry's phase in photonic waveguide arrays

*Wednesday, 3 May 2023 14:00 (1 hour)*

Non-abelian gauge fields emerge naturally in the description of adiabatically evolving quantum systems. In this talk we show that they also play a role in Thouless pumping in the presence of degenerate bands. Specifically, we consider a photonic Lieb lattice and show that when the lattice parameters are slowly modulated, the propagation of the photons bears the fingerprints of the underlying non-abelian gauge structure.

The non-dispersive character of the bands enables a high degree of control on photon propagation. Our work paves the way to the generation and detection of non-abelian gauge fields in photonic and optical lattices. The talk includes a review of the physics photonic waveguide arrays as quantum simulators and perspectives on quantum applications of Thouless pumps.

### **Abstract category**

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