

# Probing non-Abelian topological charges in the band structure of an optical kagome lattice of bosons

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Degeneracies in the band structure of lattice potentials can be characterised by topological charges. In the case where there are more than two bands involved, these charges are non-Abelian and can annihilate in a path dependent way.

In our experiment, we sympathetically cool  $^{87}\text{Rb}$  and  $^{39}\text{K}$ , which are then loaded into a triangular, honeycomb, or kagome optical lattice. We create the optical kagome lattice by overlapping a triangular and a honeycomb lattice formed with 532 nm and 1064 nm light respectively. We use the multiband structure and the symmetry of the Hamiltonian in the kagome lattice to probe these topological charges and characterise them by the Euler class  $\chi$  defined on the relevant patch of the Brillouin zone. We employ an interferometric method and compare our results by taking the same measurements in an optical honeycomb lattice, where the presence of only two bands makes the node charges Abelian.

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