

## *Simulating particle statistics with entangled photons*

Abstract: "Particle statistics govern the dynamical behaviour of quantum systems, e.g. the Pauli-exclusion principle for Fermions in contrast to bunching of Bosons. We present a scheme for simulating different particle statistics using an entangled state and multiple copies of a quantum process. We experimentally demonstrate this scheme by launching two polarisation entangled photons into a waveguide array and measuring quantum correlations between ten modes. We show fermionic dynamics including Pauli's exclusion and also fractional statistics that occur in anyonic systems. This approach generalizes to  $N$  particles and also applies to simulating Bosons with Fermions and so opens applications on a broad range of platforms."