



Contribution ID: 97

Type: **Talk**

[502] Three-dimensional quantum walks of correlated photons

Tuesday, 31 August 2021 16:45 (15 minutes)

We introduce a previously unidentified paradigm for the direct experimental realization of excitation dynamics of three-dimensional networks by exploiting the hybrid action of spatial and polarization degrees of freedom of photon pairs propagating in coupled waveguide circuits with tailored birefringence. The photons exhibit Hong-Ou-Mandel-like interference simultaneously in both degrees of freedom. In a cubic graph, their interference pattern follows a recently predicted suppression law, imposed by the graph's underlying symmetry. Moreover, the presented platform can serve as a testbed for the experimental exploration of multiparticle quantum walks on complex, highly connected graphs, suggesting a route towards exploring the dynamics of fermions in integrated quantum photonics.

Authors: Dr KEIL, Robert (University of Innsbruck, Austria); Mr ERHARDT, Max (University of Rostock, Germany); Mr MACZEWSKY, Lukas (University of Rostock, Germany); Dr DITTEL, Christoph (University of Freiburg, Germany); Dr HEINRICH, Matthias (University of Rostock, Germany); Prof. SZAMEIT, Alexander (University of Rostock, Germany)

Presenter: Dr KEIL, Robert (University of Innsbruck, Austria)

Session Classification: Quantum Information and Quantum Computing

Track Classification: Quantum Information and Quantum Computing