

Abstract Submitted
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Generation and characterization of hypercubic cluster states in the optical frequency comb MORAN CHEN, PEI WANG, Department of Physics, University of Virginia, NICOLAS MENICUCCI, School of Physics, The University of Sydney, OLIVIER PFISTER, Department of Physics, University of Virginia — We report on experimental progress toward generating and characterizing a very large quantum wire cluster state of the continuous electromagnetic variables (“Qmodes”) in the optical frequency comb of an optical parametric oscillator (OPO). We also present a proposal for creating higher-dimensional graph states by entangling the linear cluster states of several OPOs, each OPO adding a dimension to the graph (line, square grid, cube, hypercube). Besides the scalable (in number, size, and dimension) creation of sophisticated quantum graphs over hundreds to thousands of Qmodes, this work also constitutes a considerable experimental simplification of our previous proposal for generating a square-grid cluster state in a single OPO.

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