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Prize for a Faculty Member for Research in an Undergraduate Institution Talk: Quantum Interference and Imaging with Correlated Photons

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Advances in the production and detection of correlated photons in the last two decades have allowed numerous tests of the fundamentals of quantum mechanics and the implementation of quantum algorithms for quantum communication, computation and imaging. Polarization-entangled states of light have enabled many of these studies. The use spatial modes of light has opened new possibilities for entanglement and imaging, where the information resides in the correlation of photon pairs. Moreover, the accessibility of low-cost devices has enabled undergraduate labs that demonstrate fundamental predictions of quantum mechanics, such as superposition and nonlocality. It has also led to a movement to reinvent how we teach quantum mechanics in light of the rise of quantum information. In this talk I will present our research efforts in quantum information and imaging with correlated photons, and the use of these methods to implement undergraduate labs to teach quantum mechanics.