1116-81-2867 **Peng Xue*** (gnep.eux@gmail.com), Department of Physics, Southeast University, Nanjing, Jiangsu 211189, Peoples Rep of China. *Quantum Simulations and Quantum Measurements via Quantum Walks.*

Firstly we experimentally investigate a photonic quantum walk and observe typical phenomena known from the wave propagation in periodic structures as ballistic spreading. We introduce site-dependent phase defects to the quantum walk which is realized by adding fully controllable polarization-independent phase shifters and observe localization and Bloch oscillations of the photons for moderate as well as Landau-Zener tunneling for strong phase gradients. Furthermore, we demonstrate a quantum walk with time-dependent coin bias. With this technique we realize an experimental single-photon one-dimensional quantum walk with a linearly-ramped time-dependent coin operation and thereby demonstrate two periodic revivals of the walker distribution. Secondly, by introducing site-dependent coin operation we can realize generalized measurements via a one-dimensional photonic quantum walk by implementing two examples, including unambiguous state discrimination of two equally probable single-qubit states and symmetric informationally complete positive operator value measurement on a single qubit. (Received September 22, 2015)