

Abstract Submitted  
for the DAMOP14 Meeting of  
The American Physical Society

**Experimental observation of entanglement duality for identical particles** JIAJUN MA, XINXING YUAN, XIUYING CHANG, PANYU HOU, CHONG ZU, LUMING DUAN, Tsinghua University, CENTER FOR QUANTUM INFORMATION TEAM — It was shown recently that entanglement of identical particles has a feature called dualism [Phys.Rev. Lett. 110, 140404 (2013)], which can be used to test quantum indistinguishability without bringing the particles together. Here we report an experiment that observes the entanglement duality for the first time with two identical photons, which manifest polarization entanglement when labeled by different paths or path entanglement when labeled by polarization states. By adjusting the mismatch in frequency or arrival time of the entangled photons, we tune the photon indistinguishability from quantum to classical limit and observe that the entanglement duality disappears under emergence of classical distinguishability, confirming it as a characteristic feature of quantum indistinguishable particles.

Jiajun Ma  
No Company Provided

Date submitted: 19 Mar 2014

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