

Abstract Submitted  
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**Experimental Greenberger-Horne-Zeilinger type six-photon quantum nonlocality** CHAO ZHANG, YUN-FENG HUANG, ZHAO WANG, BI-HENG LIU, CHUAN-FENG LI, GUANG-CAN GUO, Univ of Sci Tech of China, KEY LABORATORY OF QUANTUM INFORMATION TEAM — Quantum nonlocality gives us deeper insight into quantum physics. In addition, quantum nonlocality has been further recognized as an essential resource for device-independent quantum information processing in recent years. Most experiments of nonlocality are performed using a photonic system. However, until now, photonic experiments of nonlocality have involved at most four photons. Here, for the first time, we experimentally demonstrate the six-photon quantum nonlocality in an all-versus-nothing manner based on a high-fidelity (88.4%) six-photon Greenberger-Horne-Zeilinger (GHZ) state. Our experiment pushes multi-photon nonlocality studies forward to the six-photon region and might provide a larger photonic system for device-independent quantum information protocols.

Chao Zhang  
Univ of Sci  
Tech of China

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