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Quantum Optics,
Quantum Nanophysics &
Quantum Information

Institut für Quantenoptik und
Quanteninformation

chemisch
physikalische
gesellschaft

CoQuS Complex Quantum Systems

TU VIENNA Technische Universität Wien
Vienna University of Technology

INVITATION

to a talk held by

Prof. Bahaa Saleh

Boston University

Entangled Qubits in Photonic Spatial-Parity Space

Single-photon qubits based on parity of the transverse spatial distribution are a useful resource for quantum information processing. Experimental arrangements comprising simple linear optical components can implement Pauli spin operators, as well as rotation, in the spatial parity space. Entangled photon qubits can be generated in this space by use of spontaneous parametric downconversion. Superpositions of entangled-photon Bell states have been experimentally generated and controlled by manipulation of the optical pump's transverse spatial parity - a classical parameter. An interferometric device, isomorphic in action to a polarizing beam splitter, projects the spatial-parity states onto an even-odd basis. Using this new physical realization of photonic qubits, together with a parity-sensitive interferometer, we have recently reported the first experimental violation of Bell's inequality in the spatial domain using the Einstein-Podolsky-Rosen state. A Bell-operator value of 2.389 was recorded. This new physical realization of photonic qubits is envisioned as a foundation for future experiments and applications in quantum information processing.

Dienstag, 22. April 2008

17:30 Uhr s.t.

Großer Hörsaal der Experimentalphysik
Boltzmanngasse 5, 1. Stock, 1090 Wien