CARL VON OSSIETZKY universität OLDENBURG
FAKULTÄT V
MATHEMATIK UND NATURWISSENSCHAFTEN

Institut für Physik

Theoriekolloquium

Am **25. April 2019** um **14.15 Uhr** in **W2 1-143** hält

Frau J.-Prof. Polina Sharapova (Paderborn)

einen Vortrag mit dem Titel

Linear and nonlinear multiphoton quantum interferometry

The quantum two-photon interference, or Hong-Ou-Mandel (HOM) interference, is a powerful apparatus in modern quantum optics. The HOM interference is based on the indistinguishability of photons and can be used for precise time and phase measurements, generating entanglement and testifying a non-locality of entangled systems; the HOM interference is an essential tool in quantum information for the Bell-state measurements and an important element of quantum lithography.
However, the multiphoton interference which involves more than two photons attracts a lot of attention nowadays because it is an essential and indispensable ingredient for boson sampling and machine learning which are the first steps of future quantum computing. Moreover, the multiphoton interference allows to achieve a higher-dimensional entanglement, overcome the standard quantum limit in interferometry and create the high dimensional NOON states.
Non-linear interferometry gives a new insight at quantum interference. A non-linear interferometer is based on the parametric down-conversion process and consists of two non-linear mediums and external phase. The interferometer indicates stability to the external losses and simultaneously shows improvement in the phase sensitivity in comparison to linear interferometers. Moreover, the interferometer can be used for generating single-mode sources and making a spectral engineering of light with different intensity profiles and mode contents.
This talk will highlight the state-of-the-art of quantum interferometry and our recent advances in this field. The integrated HOM interference (HOM-chip) based on LiNbO3 technologies and its properties will be discussed. The multiphoton four-photon interference and its features from the point of view of frequency-time correlations will be explained. The multimode non-linear interferometer and its advantages will be considered in few-photon-pairs and bright regimes.

Interessierte sind herzlich eingeladen.

gez. Prof. Dr. Martin Holthaus und PD Dr. Svend-Age Biehs