Jan Sperling
(Universität Rostock)

Detection of nonclassical light

Nonclassical properties of light play a crucial role in a variety of quantum optical phenomena which have been mostly discussed in the framework of photoelectric detection theory [1]. However, modern measurement schemes employing arrays of onoff detectors are not based on photoelectric counting [2, 3]. In this talk, we give an introduction to the new detection theory for such devices by using a quantum version of the binominal statistics [4]. Moreover, directly observable nonclassicality criteria are derived that renders it possible to uncover nonclassical features of quantum light [5]. We also report on the experimental implementation of our technique for characterizing the quantumness of single-and moltimode radiation fields in the presence of high losses [6,7,8]. Thus, our approach of verifying nonclassical states of light with on-off detector systems is able to bridge the gap betwenn imperfect measurementsand the photon-resolution demands for modern applications of quantum light.
References [1] P. L. Kelley and W. H. Kleiner, Phys. Rev. 136, A316 (1964) [2] M. J. Fitch, B.C. Jacobs, T.B. Pittmann, and J.D. Franson, Phys. Rev. A 68, 043814 (2003) [3] J.-L. Blanchet, F. Devaus, L. Furfaro, and E. Lantz, Phys. Rev. Lett. 101,0233604 (2008) [4] J. Sperling, W. Vogel, and G.S. Agarwal, Phys. Rev. A 85, 023820 (2012) [5] J. Sperling, W. Vogel, and G.S. Agarwal, Phys. Rev. Lett. 109,093601 (2012) [6] T. J. Bartley, G. Donati, X.-M. Jin, A. Datta, M. Barbieri, and I. A. Walmsley, Phys. Rev. Lett. 110, 173602 (2013) [7] J. Sperling, M. Bohmann, W. Vogel, G. Harder, B. Brecht, V. Ansari, and C. Silberhorn, Phys. Rev. Lett. 115, 023601 (2015) [8] R. Heilmann, J. Sperling, A. Perez-Leija, M. Gräfe, M. Heinrich, S. Nolte, W. Vogel and A. Szameit, arXiv: 1502.04932 [quant-ph]

13. November 2015, 14:00 Uhr

Universität Stuttgart, NWZII, Raum NWZII, Raum 2.136
Pfaffenwaldring 57, 70569 Stuttgart

CO.CO.MAT