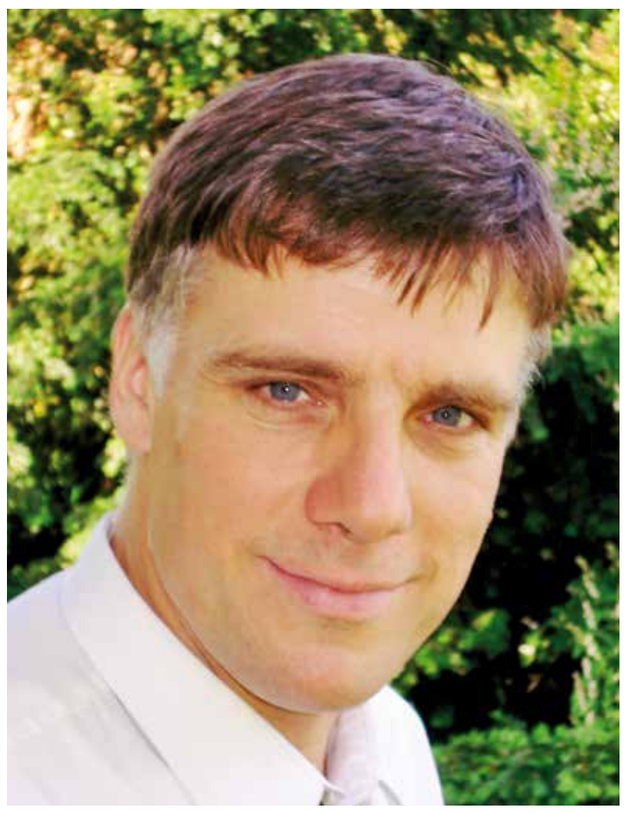
physikalisches Kolloquium

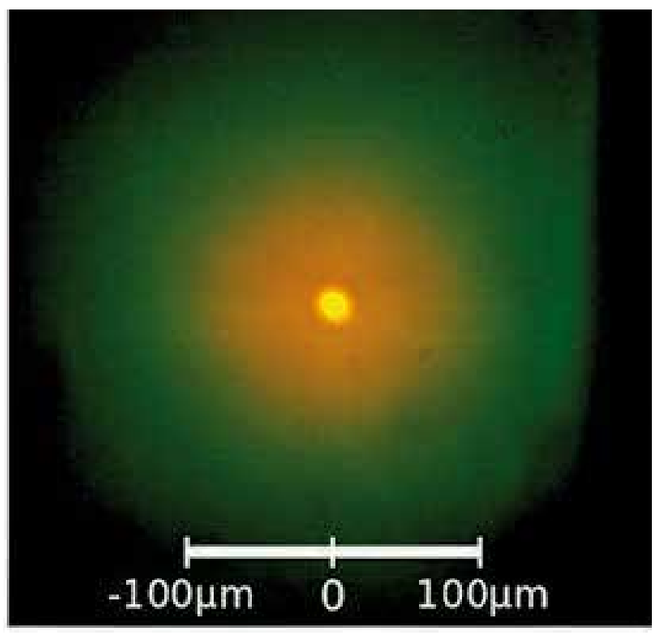


Prof. Dr. Martin Weitz
Universität Bonn

Bose-Einstein Condensation of Light

Mo. 28.11.16
16:00 Uhr
Ort: H34

Bose-Einstein condensation has been observed in several physical systems, including cold atomic gases, exciton-polaritons, and magnons. Photons usually show no Bose-Einstein condensation, since for Planck's blackbody radiation the particle number is not conserved and the photons at low temperatures vanish in the system walls. I here describe experiments with a dye-filled optical microresonator experimentally observing Bose-Einstein condensation of photons. Thermalization is achieved in a number conserving way by repeated absorption re-emission cycles on the dye molecules, and the cavity mirrors provide both an effective photon mass and a confining potential. More recently, we have investigated the condensate statistics of the photon gas, which reveals evidence for Bose-Einstein condensation in the grand canonical statistical regime due to possible effective particle exchange with the photo-excitable dye molecules. In other experiments, calorimetric properties were investigated, and we have determined both the heat capacity and the entropy of the photon gas around the phase transition. In my talk, I will begin with a general introduction and give an account of current work and future plans of the Bonn photon gas experiment.



Above: Emission of a dye-filled optical micro-resonator; condensate (peak) and thermal cloud.