

EINLADUNG ZUM
WIENER PHYSIKALISCHEN KOLLOQUIUM

BOSE-EINSTEIN-CONDENSATION OF PHOTONS

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Bose-Einstein condensation, the macroscopic ground state accumulation of particles with integer spin (bosons) at low temperature and high density, has been observed in several physical systems, including cold atomic gases and solid state physics quasiparticles. However, the most omnipresent Bose gas, blackbody radiation (radiation in thermal equilibrium with the cavity walls) does not show this phase transition. The photon number is not conserved when the temperature of the photon gas is varied (vanishing chemical potential), and at low temperatures photons disappear in the cavity walls instead of occupying the cavity ground state. Here I will describe an experiment observing a Bose-Einstein condensation of photons in a dye-filled optical microcavity. The cavity mirrors provide both a confining potential and a non-vanishing effective photon mass, making the system formally equivalent to a two-dimensional gas of trapped, massive bosons. By multiple scattering of the dye molecules, the photons thermalize to the temperature of the dye solution. 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.

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