**Making Photons Matter: When Quantum Gases of Light Condense**

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In 1900, Planck postulated that the energy of the electromagnetic field is quantized in discrete packets: "photons". The Lichtquantenhypthese not only explained the spectral distribution of photon gases in thermal equilibrium, most famously that of the Sun, but also marked the birth of quantum mechanics. But what happens if one cools down a gas of massless photons? The particles simply vanish. For more than a century, this non-conservation of photons posed a seemingly insurmountable challenge in the quest to reach a quantum many-body regime of light. In my talk, I will discuss our experiments that lead to the first observation of Bose-Einstein condensation of two-dimensional massive photons trapped inside material-filled optical microcavities. Today, quantum gases of photons provide a test bed for many-body physics under both equilibrium and driven-dissipative settings. Their high degree of experimental control over key system parameters—including dimensionality, variable potentials, and coupling to reservoirs—offers a wide range of possibilities for exploring novel states of light and matter at room temperature. I will present a series of experiments addressing long-standing open questions in fundamental physics that have become accessible through quantum gases of photons, including the grand canonical fluctuation catastrophe, the compressibility of 'photonic matter', and its critical behaviour near phase transitions. Quantum gases of light thus provide fertile ground for future studies of more exotic physical scenarios, such as non-Hermitian phase transitions, open-system topology, and physical computation.