PHYSIK

Physikalisches Kolloquium

Bose-Einstein condensation of photons

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Photons in a dye-filled microcavity reach thermal equilibrium through multiple emission and re-absorption events from a fluorescent dye. The photon populations are well described by the ideal grand-canonical distribution. With sufficient population, Bose-Einstein condensation (BEC) occurs, leading to macroscopic occupation of the lowest-energy cavity mode.

I will explore how thermal equilibrium breaks down, when the photon re-absorption rate becomes low compared to cavity loss. We observe multi-mode condensation. The system shows a rich non-equilibrium phase diagram which demonstrates how photon BEC crosses over to normal laser operation. Decondensation, where a mode's population dramatically decreases with increasing pump rate, is predicted [1]. We have recently demonstrated BEC of just 8 photons [2]. Non-equilibrium phase transitions with so few particles inspire us to re-think how we define the concept of threshold.

[1] HJ Hesten, RA Nyman, and F Mintert, Phys. Rev. Lett. 120, 040601 (2018)

[2] BT Walker ... RA Nyman, arXiv:1711.11087

Der Gast wird betreut von Herrn Priv.-Doz. Axel Pelster
Gäste sind herzlich willkommen
Kaffeeausschank ab 17:00 Uhr

Montag, 18.06.2018, 17:15 Uhr
Gebäude 46, Hörsaal 270

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