凝聚态物理-北京大学论坛

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Vortices and superfluidity in exciton-polariton condensates

Prof. Benoît Deveaud-Plédran

报告摘要： The idea of a possible Bose Einstein condensation in the solid state has been explored since the beginning of the sixties with the hope to get transition temperatures much more accessible than the temperatures needed for the condensation of atomic vapors (less than 1μK for Rubidium). The advantage in solids is that people are trying to condense excitons (an electron-hole pair in a semiconductor) with a mass similar to that of an electron, i.e. four orders of magnitude less than a rubidium atom. The price to pay is the disorder inherent to any real solid-state system as well as the limited lifetime of the quasi-particles. We are here using exciton polaritons, quasi-particles made one half from excitons and one half from a confined photon. Polaritons are then bosons with a mass five orders of magnitude lighter than an electron. Then, condensation at temperatures of the order of 300 K has been observed. The price to pay is the incredibly short lifetime of the polaritons : about onepicosecond.During this talk, I will detail our studies on the physical properties of polariton condensates. In particular, I will focus on the evidence for superfluidity through the observation of quantized vortices. I will show their time resolved behavior, and show the first direct evidence for half quantized vortices, a specialty of spinor condensates. I will also, time permitting, give evidence of the very elusive Bogoliubov Ghost branch, expectedin all superfluids.With the hard work of : KG Lagoudakis, V. Kohnle, T. Paraiso, G. Nardin, R. Cerna, F. Manni, G. Grosso, Y. Léger, M. Portella Oberli, F. Morier Genoud.

Prof. Benoît Deveaud-Plédran， Professor Benoît Deveaud-Plédran is the dean of research in EPFL and the president of the research commission of official Swiss National Science Foundation group. He is a specialist in the optical spectroscopy of semiconductors, in particular ultrafast and coherent optical spectroscopy. Over the last few years, he has developed novel tools such as actively stabilized interferometers, able to perform spectral interferometry. His group has also developed the first ever picosecond cathodoluminescence set-up, now the core business of the start-up Attolight, and is a world leader in the study of Bose Eisntein condensation of exciton polaritons (quasiparticles born from the strong coupling of light with electronic excitations in a semiconductor). Among the latest findings of the group: the observation of vortices in the condensate; the observation of novel topological entities such as half vortices; dark solitons and spin vortices.

时间：10月11日（星期四）15:00—16:40

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