



先端光量子科学アライアンス 談話会



UT-PSC

光量子科学研究センター セミナー

フotonサイエンス研究機構 セミナー

“Exciton-Polariton-Lattice Systems Towards Quantum Simulators”

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日時：平成25年12月16日(月) 10:00-11:00

場所：東京大学理学部1号館2階 201A 号室

Abstract

Microcavity exciton-polaritons are hybrid light-matter quasi-particles as an admixture of cavity photons and quantum well excitons. The inherent light-matter duality provides experimental advantages to form coherent condensates at high temperatures (e.g. 4 K in GaAs and room temperature in GaN materials), and to access the dynamics of exciton-polaritons. Utilizing coherence and open-dissipative nature of exciton-polariton condensates, we engineer a two-dimensional (2D) polariton-lattice system for investigating exotic quantum phase order. Via micro-photoluminescence measurements in both real and momentum spaces, we have observed d-orbital condensate states, vortex-antivortex phase order, massless Dirac dispersions in 2D square, honeycomb, and triangular lattices respectively. These results demonstrate that the polariton-lattice systems will be promising solid-state quantum emulators in the quest for better understanding strongly correlated materials and in the development of novel optoelectronic devices.

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