

# PHYSICS AND ASTRONOMY COLLOQUIUM

## Peter Littlewood, Ph.D.

Argonne National Laboratory, Argonne IL  
James Franck Institute, University of Chicago

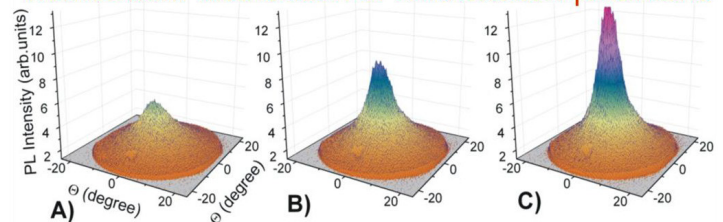
### Polariton Condensation

Macroscopic phase coherence is one of the most remarkable manifestations of quantum mechanics, yet it seems to be the inevitable ground state of interacting many-body systems. In the last two decades, the familiar examples of superfluid He and conventional superconductors have been joined by exotic and high temperature superconductors, ultra-cold atomic gases, both bosonic and fermionic, and recently systems of excitons, magnons, and exciton-photon superpositions called polaritons, the subject of this talk.

Engineering of optical microcavities make use of the mixing of electronic excitations with photons to create a composite boson called a polariton that has a very light mass, and recent experiments provide good evidence for a high-temperature Bose condensate. Polariton systems also offer an opportunity to use optical pumping to study quantum dynamics of a many body system outside equilibrium, in a new kind of cold atom laboratory.



Momentum distribution of cold exciton-polaritons



Kasprzak et al Nature 443, 409 (2006)

**THURSDAY, NOVEMBER 21, 2013 | 4:00 PM | HAWKING AUDITORIUM**



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