Polariton Condensation and Dynamics

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The engineering of optical microcavities allow us to hybridize 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. As in electronic strongly correlated systems, some of the most strongly interacting polariton systems have strong electron-phonon coupling as well. I will also discuss aspects of non-linear polariton dynamics, and the opportunity to create states with non-trivial entanglement by tailored optical pumping.