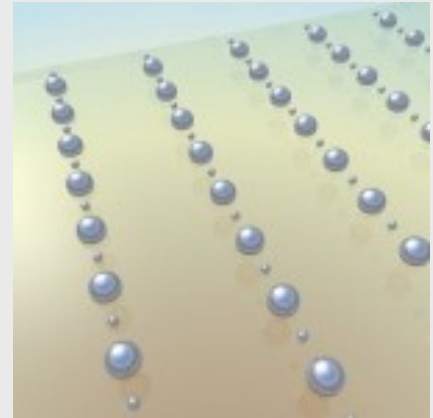


## Signatures of Quantum Condensation in a Plasmonic Nanoparticle Array

Tuesday, 21st March 2013. 12:00-13:00



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ABSTRACT:

**W**e present experimental signatures of quantum condensation in a plasmonic system. We investigate a periodic array of metallic nanorods covered by a polymer layer doped with an organic dye at room temperature. Surface lattice resonances of the array - hybridized plasmonic/photonic modes - couple strongly to excitons in the dye, and bosonic quasi-particles known as plexcitons are formed. By increasing the plexciton density through optical pumping, we observe the emergence of Bogoliubov-Goldstone excitations on top of the strongly coupled plexciton band in the light emission dispersion diagram. The Bogoliubov-Goldstone mode shows signatures of thermalization and condensation, despite the nonequilibrium character of this driven and dissipative system.