# Quantum condensation from tailored exciton populations.

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We present a proposal [1] of a new experimental approach to quantum condensation of excitons and photons in semiconductor microcavities. Whereas in existing approaches relaxation and inelastic scattering play a crucial, yet poorly-understood role, we show how condensates could form in their absence.

Our proposed experiment involves a microcavity containing an ensemble of quantum dots. In the first stage of our proposed experiment the microcavity is excited with a chirped laser pulse, which we show can create an energy-dependent population in the inhomogeneously-broadened exciton line. In the second stage of our proposed experiment, this incoherent population then spontaneously evolves into an off-equilibrium condensate. We demonstrate this phenomenon in simulations with realistic parameters, and explain that it is due to a dynamical analog of the BCS instability. The key to achieving it is the possibility of using a controlled laser pulse to directly create, in only a few picoseconds, an exciton population with an effective temperature of only 1 K.

## References

[1] P. R. Eastham, R. T. Phillips, arxiv:0708.2009 (2007).