Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Engineering non-Hermitian optical potentials for Polariton Condensation SAEED KHAN, Department of Electrical Engineering, Princeton University, LI GE, Department of Engineering Science and Physics, College of Staten Island, CUNY, HAKAN TURECI, Department of Electrical Engineering, Princeton University — We present a theoretical study of incoherently pumped exciton-polariton condensates in general cavity geometries, based on an analysis of the linear non-Hermitian modes of the (optical) pump induced potential. An analytical description is obtained for how the threshold pump power for condensation into a specific mode depends quantitatively on the relative spatial profiles of that mode and the pump. Specifically, we show that for a general pump profile, modes which best organize to balance the amplification from the pump against the repulsive pump potential achieve the lowest threshold power [1]. Reversing this idea, choosing the spatial profile of the pump provides control over which spatial mode condenses at lowest power. Our work hence provides a scheme to engineer non-Hermitian optical potentials for preferential polariton condensation into a specific mode, by an appropriate choice of pump profile. This approach has recently been used to achieve condensation in the flat band of a Lieb chain of micropillar cavities, where the flat band has energy above the ground state and hence cannot be studied in systems in thermal equilibrium [2].

References:

[1] L. Ge, *et. al.*, arXiv: 1311.4847 (2013)
[2] F. Baboux *et. al.*, arXiv: 1505.05652 (2015)

Saeed Khan
Princeton Univ

Date submitted: 06 Nov 2015 Electronic form version 1.4