

Abstract Submitted
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Competing role of Interactions in Synchronization of Exciton-Polariton condensates¹ SAEED KHAN, HAKAN E. TURECI, Department of Electrical Engineering, Princeton University — We present a theoretical study of synchronization dynamics in incoherently pumped exciton-polariton condensates in coupled traps [1]. Our analysis is based on an expansion in non-Hermitian modes that take into account the trapping potential and the pump-induced complex-valued potential [2]. We find that polariton-polariton and reservoir-polariton interactions play competing roles in the emergence of a synchronized phase as pumping power is increased, leading to qualitatively different synchronized phases. Crucially, these interactions can also act against each other to hinder synchronization. We present a phase diagram and explain the general characteristics of these phases using a generalized Adler equation. Our work sheds light on dynamics strongly influenced by competing interactions particular to incoherently pumped exciton-polariton condensates, which can lead to interesting features in recently engineered polariton lattices [3].

[1] S. Khan, H. E. Tureci, arXiv: 1610.04168 (2016)

[2] S. Khan, H. E. Tureci, arXiv: 1608.07557 (2016, to appear in Phys. Rev. A)

[3] F. Baboux *et. al.*, Phys. Rev. Lett. 116, 066402 (2016)

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