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Blueshift corrections of a 1D exciton-polariton condensate

Exciton-polariton are bosonic quasi-particles that arise from the strong coupling between light and matter. They are typically formed in a quantum well embedded in an optical microcavity, from the interaction between quantum well excitons and cavity photons. Under non-resonant pumping, it is shown that exciton-polariton can form a Bose-Einstein condensate (BEC) [1]. This out of equilibrium BEC is sustained in a stationary state by the competition between continuous laser driving and losses coming from the leakage of cavity photons. Recent studies focused on the coherence properties of such driven-dissipative condensates and established connections with the Kardar-Parisi-Zhang (KPZ) universality class [2]. In particular, it is now known that the variance of the phase of one-dimensional polariton condensates follows the KPZ scaling in space and in time [3]. Chemical potential corrections are extensively studied for equilibrium BECs [4]. However, a description of these corrections is still lacking in driven-dissipative condensates. In the defect-free KPZ phase [5] of a 1D polariton BEC, we investigate the blueshift stochastic fluctuations, analogue of beyond mean field chemical potential corrections.

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