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**SLIM IBRAHIM**, University of Victoria

*Ground State Solutions of the Gross Pitaevskii Equation Associated to Exciton-Polariton Bose-Einstein Condensates*

We investigate the existence of ground state solutions of a Gross-Pitaevskii equation modeling the dynamics of pumped Bose Einstein condensates (BEC). The main interest in such BEC comes from its important nature as macroscopic quantum system, constituting an excellent alternative to the classical condensates which are hard to realize because of the very low temperature required. Nevertheless, the Gross Pitaevskii equation governing the new condensates presents some mathematical challenges due to the presence of the pumping and damping terms. Following a self-contained approach, we prove the existence of ground state solutions of this equation under suitable assumptions: This is equivalent to say that condensation occurs in these situations. We also solve the Cauchy problem of the Nonlinear Schrödinger equation and prove some corresponding laws