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Instability of a superfluid Bose gas induced by a locked thermal gas in an optical lattice SATORU KONABE, TETSURO NIKUNI, Tokyo University of Science — We use a dissipative Gross-Pitaevskii equation derived from the Bose-Hubbard Hamiltonian to study the effect of the thermal component on the stability of a current-carrying superfluid state of a Bose gas in an optical lattice potential. We explicitly show that the superfluid state becomes unstable at certain quasi-momentum of the condensate due to a thermal component which is locked by an optical lattice potential. It is shown that this instability coincides with the Landau instability derived from the GP equation.

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