Kosterlitz-Thouless physics in a one-dimensional optical lattice\textsuperscript{1}
ANIBAL IUCCI, University of Geneva, Switzerland, MIGUEL A. CAZALILLA, Donostia International Physics Center, Spain, THIERRY GIAMARCHI, University of Geneva, Switzerland — We study a system of quasi two-dimensional Bose gases formed in the nodes of a one-dimensional optical lattice potential. We focus on the effect of the tunneling of the atoms between adjacent planes on the Kosterlitz-Thouless crossover recently observed in the experiments of the Paris group [Z. Hadzibabic et al., Nature (London) 441, 1118 (2006)]. We compute the contrast of the interference pattern between two condensates, finding a behavior different from the one observed in the Kosterlitz-Thouless crossover. Finally, we consider the stack of a large number of pancakes.

\textsuperscript{1}We gratefully acknowledge financial from the Swiss National Science Foundation under MaNEP and Division II, and Gipuzkoako Foru Aldundia (Basque Country)

Anibal Iucci
University of Geneva

Date submitted: 20 Nov 2006

Electronic form version 1.4