Correlation properties of atoms in two strongly coupled waveguides[1] VANJA DUNJKO, MAXIM OLSHANII[2], University of Southern California — Behavior of an atomic gas in two neighboring waveguides is governed by a coupled two-specie Lieb-Liniger model. When tunnelling between two Lieb-Liniger gases is greater than all other energy scales, it is possible to treat the coupled system as a new Lieb-Liniger gas with an effective coupling constant, which we compute. The elements of the two-body density matrix involving excited dressed states are slaved to the density matrix of the effective Lieb-Liniger gas. Using these functions, we compute the relative phase fluctuations between the coupled gases, and compare with Whitlock and Bouchoule's results [Phys. Rev. A **68**, 053609 (2003)] valid for arbitrary tunnelling but weak interatomic interaction.

Vanja Dunjko
University of Southern California

Date submitted: 02 Feb 2005

Electronic form version 1.4