Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Counterflow and paired superfluidity in one-dimensional Bose mixtures ANZI HU, LUDWIG MATHEY, Joint Quantum Institute, University of Maryland and National Institute of Standard and Technology,Gaithersburg, MD 20899, IPPEI DANSHITA, Department of Physics, Faculty of Science,Tokyo University of Science,Shinjuku-ku,Tokyo 162-8601, Japan, CARL WILLIAMS, CHARLES CLARK, Joint Quantum Institute, University of Maryland and National Institute of Standard and Technology,Gaithersburg, MD 20899 — Experimental progress in recent years has made it possible to realize mixtures of cold atoms in optical lattices. In this talk,we present our work on two types of superfluidity in 1D Bose mixtures: the counterflow superfluid and the paired superfluid phase, each of which can coexist with charge-density wave order. We predict and identify these phases both with Luttinger liquid theory and with numerical simulations. Specifically, we show the phase diagram as a function of the filling fraction and the inter-species interaction. We address the question of realizability and detectability of these phases by adding a trap potential, and by calculating various quantities that can be measured in experiment.

Anzi Hu
Joint Quantum Institute, University of Maryland and
National Institute of Standard and Technology

Date submitted: 01 Dec 2008 Electronic form version 1.4