Abstract Submitted
for the DAMOP06 Meeting of
The American Physical Society

Atom chip for studying the 1D Bose gas A.H. VAN AMERONGEN, J.J.P. VAN ES, N.J. VAN DRUTEN, University of Amsterdam — We have developed an "atom chip" for the study of ultracold atoms. The lithographically patterned current carrying wires appear particularly suited to realize atom waveguides and other (quasi-)one-dimensional (1D) structures. For the study of repulsive bosons we constructed a wire layout to reach tight radial confinement and low axial density: a 1D box for atoms. We also plan to study the quantum gas in the crossover from the 3D to the 1D regime. Once in the 1D, regime counterintuitively the atoms become more strongly interacting as the axial density is decreased. At present we optically cool and magnetically trap 10^7 atoms with a phase space density of 10^{-6} at a distance of 1 mm from the chip surface. This stage is reached using two layers of macroscopic copper wires under the microchip. We then transfer the cold sample to the chip-wire trap $\sim$100 μm from the surface. In our contribution we will discuss our trap design and our progress with the loading of the box potential and evaporative cooling towards quantum degeneracy.

A.H. van Amerongen
University of Amsterdam

Date submitted: 30 Jan 2006 Electronic form version 1.4