Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

Self-trapped atom corrals JEAN-FELIX RIOU, DAVID S. WEISS, Physics Department, The Pennsylvania State University, University Park, PA 16802 — We will describe an experiment with a coupled array of 1D quantum degenerate gases in the mean-field regime. Transverse tunneling is suppressed when there is a sufficiently large difference in the mean-field energy of adjacent tubes. This phenomenon of self-trapping is strongest near the edge the bundle of tubes, where the tube occupation gradients are largest. With the right parameters, atoms that start to expand transversely from the central tubes are reflected by a self-trapped corral. The resulting ring structures do not correspond to any features of the trapping potential. As the atoms expand along the tubes, their density gradients drop until suddenly the self-trapped corral gives way, and the atoms expand in all directions.

Jean-Felix Riou
Physics Department, The Pennsylvania State University,
University Park, PA 16802

Date submitted: 31 Jan 2008 Electronic form version 1.4