Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Superconducting atom chips: recent results and prospects
ADRIAN LUPASCU, CEDRIC ROUX, ANDREAS EMMERT, THOMAS NIRRENGARTEN, GILLES NOGUES, MICHEL BRUNE, JEAN-MICHEL RAIMOND, SERGE HAROCHE, Kastler-Brossel Laboratory, Ecole Normale Supérieure (Paris) — Atom chips offer a very interesting set of tools for the magnetic trapping and manipulation of neutral atoms close to surfaces and on-chip optoelectronic devices. In our experiments we investigate atom chips built using superconducting wires in a cryogenic environment. We have recently produced the first Bose-Einstein condensate using this setup. We observe the onset of the Bose-Einstein condensation for 1 x 10^4 atoms at a temperature of 100 nK. This result opens the way for studies of ultra-cold atoms interacting with superconducting structures. We also envision to excite the dense atomic cloud towards long lived Rydberg states. Making use of the phenomenon of dipole blockade could lead to the deterministic production of a single atom in a Rydberg state.

Adrian Lupascu
Kastler-Brossel Laboratory, Ecole Normale Supérieure (Paris)

Date submitted: 29 Nov 2007 Electronic form version 1.4