

Quiprocone Funding Report
Dr. Ron Folman

Visit to Heidelberg on the 16th of August by Prof. Nir Davidson
Weizmann Inst. of Science

Prof. Davidson has performed recently at the Weizmann inst. some novel BEC experiments, as well as some experiments on dark traps (references below). He has described these experiments to us.

As we deal with neutral atoms as the qubit and as our qubit source is BEC, it was helpful to hear new ideas about BEC preparation and manipulation. Specifically, the acoustic splitting of the BEC might have use in this context in the future.

With regards to dark traps, we have learned new techniques concerning the fast manipulation of light beams for trapping. These techniques may be used for switching light beams for the individual addressing of isolated atoms (qubits).

1. "Observation of chaotic and regular dynamics in atom-optics billiards", N.Friedman, A. Kaplan, D. Carasso, and N. Davidson, Phys. Rev. Lett. 86, 1518 (2001).
2. "Islands of stability in soft-walls atom-optics billiards", A. Kaplan, N. Friedman, M. F. Andersen, and N. Davidson, Phys. Rev. Lett. 87, 274101 (2001).
3. "Optimized single-beam dark optical trap", A. Kaplan, N. Friedman, and N. Davidson, J. Opt. Soc. Am B 19, 1233 (2002).
4. "Stable islands in chaotic atom-optics billiards, caused by curved trajectories", M. F. Andersen, A. Kaplan, N. Friedman, and N. Davidson, Appl. Phys. B: At. Mol. Opt. Phys. 35, 2183 (2002).
5. "Dark optical traps for ultra-cold atoms", N. Friedman, A. Kaplan, and N. Davidson, Advances in Atomic, Molecular and Optical Physics Vol. 44, in press (Academic Press 2002).
6. "Suppression of inhomogeneous broadening in rf spectroscopy of optically trapped atoms", A. Kaplan, M. F. Andersen, and N. Davidson, Phys. Rev. A, in press (2002).
7. "The excitation spectrum of a Bose-Einstein Condensate", J. Steinhauer, R. Ozeri, N. Katz, and N. Davidson, Phys. Rev. Lett. 88, 120407 (2002).
8. "Direct observation of the phonon energy in a Bose-Einstein condensate by tomographic imaging", R. Ozeri, J. Steinhauer, N. Katz, and N. Davidson, Phys. Rev. Lett. 88, 220401 (2002).
9. "Baliaev damping of quasi-particles in a Bose-Einstein condensate", N. Katz, R. Ozeri, J. Steinhauer, and N. Davidson, submitted to Phys. Rev. Lett. (2002).