

Atom chip group – Ben-Gurion University
Group head: Ron Folman

Our group deals with the theoretical and experimental study of atom physics, many body physics, and quantum phenomena. We utilize ultra cold atoms (BECs), cold atoms, hot atoms and even atoms within a solid lattice.

Our web site is www.bgu.ac.il/atomchip, where one may find among other things a brief account of our experiments, copies of our student theses, a description of our latest news, a collection of our papers, a list of our visitors, and the group head CV.

We have recently received 4 awards:

The MRS (Material Research Society) excellence graduate award

The Zabey prize for an excellent MSc work

The Willis E. Lamb award (<http://www.lambmedal.org/2011/index.html>).

The Miller Institute award for fundamental studies.

A popular account of the atom chip and our vision is given in:
<http://www.azonano.com/article.aspx?ArticleID=2904>

Our fundamental studies include interferometry, coherent control, atomic structure, light-matter and matter-matter interactions. We are very much interested in fundamental questions, e.g. noise and its relation to dephasing of quantum states, a topic related to the border between the quantum and the classical worlds. We collaborate with a number of experimental groups and theoreticians around the world such as the Budker group at Berkeley and Carsten Henkel in Berlin. We have recently received a very large grant from the European Union to study atom interferometry.

Aside from fundamental studies, we have numerous collaborations with the industry such as a magneton grant with the IAI and a NATO grant concerning magnetic sensing, and a government grant for cold atomic clocks with AccuBeat. Another government grant (Kamin) was awarded to us for constructing a miniature cold atom source. On the far reaching application of quantum computing we refer the interested reader to a book recently edited by RF: <http://www.springerlink.com/content/1570-0755/10/6/> .

Finally, for the purposes of the atom chip, we have constructed at BGU a cutting edge fabrication facility (<http://in.bgu.ac.il/en/nano-fab/Pages/default.aspx>) which is now being used not only by numerous BGU researchers, but also by researchers in other universities in Israel and around the world, as well as by many Israeli industries. Our unique knowhow in chips for quantum optics has led groups around the world to request samples from us. For example, in 2008, a high quality chip made by us gave rise to the discovery of a new phenomenon in electron transport (this was published in Science). Recent atom chips were sent to Germany, England, Italy and the Netherlands. Currently a chip for the US (Berkeley) is being fabricated.