



# The Atom Chip Lab

## Researcher

**Prof. Ron Folman**  
Department of Physics

## Research

Prof. Folman conducts experimental and theoretical studies related to quantum optics and specifically, matter-wave optics (i.e., atom optics with ultra-cold atoms). Prof. Folman constructs chips that interface with single or groups of atoms, called Atom Chips. The Atom Chip brings together the best of both worlds: the relatively mature field of micro- and nano-fabrication and the new set of scientific rules provided by quantum theory. Together they form quantum technology, with the promise of novel applications. The chip is at room temperature, while the atoms are cooled by lasers to nano-Kelvin.

The group works on questions related to fundamental studies of quantum mechanics such as decoherence and interferometry, and for applications such as clocks, inertial navigation, gravitational field sensing, magnetic sensing, and steps towards quantum communications and computing. For example, the group is now building the next generation of miniature atomic clocks (with cold atoms) together with AccuBeat, constructing miniature magnetic sensors for IAI and NATO, and is even applying such sensors for the probing of neurons.

## Applications & Products

- Atomic clock, magnetic sensors, gravitational sensors, acceleration sensors
- Photonics: chip-scale sensors for trace amounts of materials down to single atoms
- Materials and surface science by surface probing