

## *Editorial*

### **Special issue: Nanomanipulation of atoms**

Laser cooling and atom optics can be regarded today as mature fields of optical and atomic physics as far as understanding of basic phenomena and principles is concerned. An interesting question remains, however, as to what extent applications in physics and beyond will occur. One field of intense research is the application of atomic de Broglie waves in atom interferometry, which gives access to novel high precision measurements of important physical quantities.

In another line of experiments strong localization of atoms, which at laser cooling energies occurs naturally at sub nanometre scales, is exploited. The special issue “Nanomanipulation of Atoms” deals with several concepts and methods currently investigated around the world within the framework of controlled positioning of atoms at nanometre scales: Following the intriguing advances in scanning probe microscopy another field of physics is beginning to be fascinated by methods of atomic engineering.

Topics of current research include aspects of atom lithography, direct growth of structured crystals and an attempted combination of atom optics with microelectronic circuitry. It is interesting to note that in these methods atom optics touches and merges with other fields such as surface physics, raising prospects of novel interdisciplinary research. Future applications may be also enhanced through the application of coherent matter waves which have recently emerged as a novel and ground-breaking research tool. In most cases of interest, however, atomic flux densities exceeding existing atom lasers by many orders are required.

Since atom optics is clearly transgressing its own field an applied physics journal such as the present one is the best location to make new results in this field available to a widespread audience. With this special issue we wish to encourage research groups not only to enter an exciting field of research but also to choose *Applied Physics B – Lasers and Optics* as the forum to present their results.