

# Research Topics 1999



## Micro Optics for Atom Lithography

### Collaborating Organisations:



University of Melbourne, Department of Physics.

### Objectives

To fabricate 3D diffractive and phase micro optical structures that modify the spatial intensity pattern of a laser. The modified beam is to be used to guide and focus a beam a super cooled metal atoms for atom lithography.

### Expected Outcomes

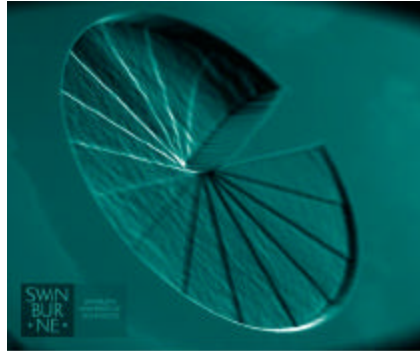
This project has demonstrated a rapid method for fabricating phase and diffractive micro optical structures in polymer materials. In the case of the diffractive structure, the 2D patterns to be machined is prepared on a chrome-on-quartz mask with a scale 10x greater than that required for the final structure. This is then imaged in the excimer laser micromachining system using 10x reduction and ablated into polymers. The phase micro optic is a 3D structure which is machined by breaking down the final structure into a series of 2D overlapping patterns that are ablated sequentially into the polymer. The multi-level machining process takes only a few minutes to complete.

### Researchers

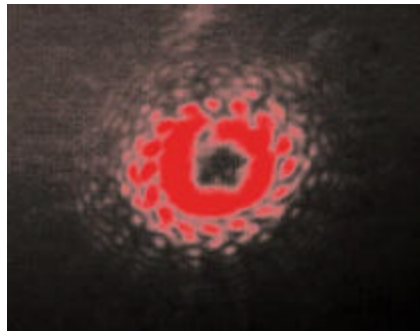
Dr. Jason Hayes (IRIS)  
Tracy Mackin (Uni. Melb)

### Research Coordinators:

A/Prof Erol Harvey (IRIS)  
Dr. Robert Scholten (Uni. Melb)



A 1mm diameter multi-level phase micro optic



The modified phase laser beam showing a 'donut' mode.