UNIVERSITY OF CAMBRIDGE

Hybrid Carbon Nanotube Liquid Crystal Devices

Novel micro-optical components

Dr Tim Wilkinson is a Reader in Photonic Engineering in the Engineering Department and a fellow of Jesus College. He has been working in the field of free-space optics, devices and systems for over 15 years. He developed the binary phase-only matched filter (BPOMF) and 1/f joint transform correlators during this PhD, and has since filed several patents and authored and co-authored over seventy refereed journal papers on optical applications, processing and devices. Recent research has involved applications of holographic technology including adaptive optical interconnects, optical pattern recognition and display applications for novel liquid crystal electro-optic devices, and he has given several invited talks at major conferences, including FLC 2001 and MRS Fall Meeting 2004. In 2001 he was awarded the Ben Sturgeon prize by the SID for his work in display technology.

Multiwall carbon nanotubes (MWCNTs) are normally grown as tangled masses by laser ablation or arc discharge. However, using plasma enhanced chemical vapour deposition (PECVD) techniques it is possible to grow dense aligned mats of 'grass-like' MWCNTs as well as individual nanotubes in sparse arrays through the use of ebeam patterning of the catalyst. The fact that they exhibit very high conductivity and aspect ratio means that we can use them as electron sources, as has been demonstrated in field emission displays, and as microwave sources. Conducting MWCNTs can also be used as electrode structures in optically anisotropic media such as liquid crystals, as potential alignment layers and making novel micro-optical components possible. Dr Wilkinson's research has recently demonstrated an electrically switchable micro-optical component based on a sparse array of MWCNTs grown on a silicon surface, forming half of a liquid crystal cell.

Other technologies that Dr Wilkinson is currently working on: 2D and 3D holographic projection, optical comparators and liquid crystal lasers

Dr Wilkinson's areas of expertise include:

- Holography
- Adaptive optics
- Novel liquid crystal devices
- Electro-optic effects
- Optical correlators/comparators
- Fabrication of liquid crystal devices

Dr Tim Wilkinson,
Reader, University of Cambridge

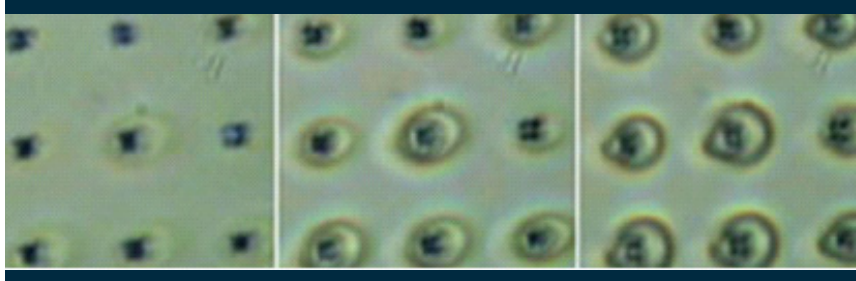
Supported by EPSRC

Applicable to:

- Displays
- Adaptive optics

Partner Companies:

- Samsung



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