



## **ICFO Colloquium PHILIP RUSSELL 'Gas, glass & light: controlling light-matter interactions in microstructured optical fibres'**

**PHILIP RUSSELL**

November 07, 2014

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Friday, November 7th, 12:00, ICFO's Auditorium

### **PHILIP RUSSELL**

Director of the Max Planck Institute for the Science of Light in Erlangen, Germany. Philip Russell is a Director at the Max-Planck Institute for the Science of Light (MPL), a position he has held since January 2009 when MPL was founded. He is also professor in the Department of Physics at the University of Erlangen-Nuremberg. He obtained his D.Phil. (1979) degree at the University of Oxford. He is a Fellow of the Royal Society, the Optical Society of America (OSA) and the UK Institute of Physics and has won several awards for his research including the 2013 EPS Prize for Research into the Science of Light, the 2005 Korber Prize for European Science, the 2005 Thomas Young Prize of the Institute for Physics (UK) and the 2000 OSA

Joseph Fraunhofer Award/Robert M. Burley Prize. He is also OSA's 2014 President-Elect. Microstructured fibres, in particular photonic crystal fibres (PCFs), permit remarkable control of the propagation of guided light, including introducing a new theme - the guidance of light, in a low-loss single mode, in a microscopic hollow channel. This last represents one of the most exciting opportunities in recent years, for it allows one for the first time effectively to eliminate beam diffraction in empty space or in materials with low refractive indices such as gases, vapours and liquids. As a result a new generation of versatile and efficient gas-based systems, such as pulse compression devices, light sources tunable from the vacuum UV to the near IR and nonlinear devices based on alkali metal vapours, is emerging. PCFs with solid glass cores continue to inspire applications beyond the well-established fields of soliton dynamics and supercontinuum generation. For example, when the fibre is twisted continuously (by thermal post-processing) along its axis, orbital angular momentum states are created in the cladding that couple to the core light at certain resonant wavelengths, creating deep dips in the transmitted spectrum. Another new field is that of opto-acoustic devices, where the light itself drives mechanical resonances in the core structure. These resonances act back on the light, leading to the generation of frequency combs and Raman-like self-pulsations.

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