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Ph.D. Program in Electronics, Computer Science and Electrical Engineering

SEMINAR

Dielectric Crystalline waveguides for Laser devices

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Aula Seminari Magenta**

Abstract: Crystalline waveguides have been the backbone of semiconductor diode lasers for over half a century, enabling efficient Lasers that underpin much of Photonics as we know it. To capitalize on higher bandgap materials with potential for smaller reabsorption losses and larger resonator-mode areas, we can exploit dielectric materials. For the waveguide geometry the challenge has been fabrication, though this is well understood for glass optical fibre waveguides, it is still difficult to make crystalline dielectric waveguides with comparable low-loss properties. In this presentation I review some of the key milestones for optically active dielectric crystalline waveguides and devices and recent progress in nanoengineering key surfaces in these materials that allow coupling between free space and the waveguide. Thus, taking advantage of waveguide and bulk-laser characteristics for power-scaling novel laser systems.

Bio: Dr Jacob Mackenzie has 25-years' experience in laser development and photonic materials science. Since 2014 he's been Associate Professor in the Optoelectronics Research Centre at the University of Southampton and from 2004 to 2009 was a Royal Academy of Engineering Research Fellow. He has published over 200 conference and journal papers, which focus on research into novel materials and photonics systems, with particular emphasis on new laser materials and operating regimes that target a broad range of applications in materials processing, space-borne LIDAR, and integrated photonics. Capitalising on considerable experience in all aspects of efficient diode-laser-pumping of various laser architectures; fabrication of thin-film optical materials coupled with characterisation of their spectroscopic properties; and surface structuring methods to create sub-wavelength photonic devices. His team has made numerous advances in pulsed-laser deposition techniques for improving the quality and growth rates of crystal films for both optically active and passive components.

Organizer

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