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Quantum Science Distinguished Lecture Series

The rise of bosonic lasers

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Nuffield Music Annex, Building 2A, Room 2065
Wednesday 18 February 2015, 5pm – 6pm. Refreshments served from 4.30pm
Register your place: http://quantumscience-kavokin.eventbrite.co.uk

Abstract: Bosonic lasers are optical devices spontaneously emitting monochromatic and coherent light. They are based on the Bose-Einstein condensation of light-matter quasiparticles: exciton-polaritons. Recently we have proposed that the emission rate of THz photons may be increased by bosonic stimulation if the THz transition feeds a condensate of exciton-polaritons. The vertical terahertz lasing coexists with polariton lasing and, consequently, is characterised by a low pumping threshold. Further improvement of quantum efficiency of bosonic terahertz lasers may be achieved taking advantage of a cascade effect in a parabolic trap where the THz transition between equidistant exciton energy levels is optically allowed. Bosonic cascade lasers are predicted to achieve quantum efficiencies of 500-700% in realistic structures.

Biography: Alexey Kavokin, born in St-Peterburg in 1970, obtained his PhD from the Ioffe institute of Russian Academy of Sciences in 1993. In 1998 he was appointed Professor at the Blaise Pascal University (France), in 2005 he moved to Southampton to become a Chair of Nanophysics and Photonics. Alexey is known for his theoretical works on physics of exciton-polaritons which paved way to realization of first Bosonic lasers: polariton lasers.

He has published over 200 research papers, 2 text books on physics and several fiction books.

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