Andrew Greentree

RMIT University

Australian Research Council Centre of Excellence for Nanoscale BioPhotonics

Strategies for global entangled states and distributed quantum protocols

or how quantum ships will make the world weirder

Martedì 16 maggio, 15:00

Sala Castagnoli, Dipartimento di Fisica, via P. Giuria 1, Torino

contatto: **Paolo Olivero (olivero@to.infn.it)**

Abstract

Twentieth Century technology has been driven by the application of quantum mechanics to two of the most important tasks facing humanity: computation and communication. Computation was revolutionised by the invention of the transistor, while communication was revolutionised by the inventions of the laser and the optical fibre. But the quantum mechanics of the twentieth century is only half the story and doesn't utilise the very strange physics of entanglement and nonlocality - so called 'spooky action at a distance'. One push for twenty first century technology is the construction of quantum computers, and connecting them via a quantum internet. There are major challenges to realising a quantum internet, and they are more than just technical difficulties. In this talk, I will motivate in a non-technical way why we care about quantum entanglement for computation and communication, some strategies for sharing quantum information, and then a new concept for entanglement distribution based on the idea of a quantum sneakernet - a transpacific quantum channel with the potential for achieving a Tera e-bit/second quantum channel using ships [Devitt et al., *High speed quantum networking by ship*, Scientific Reports 6, 36163 (2016)].

The speaker

Andy Greentree is an Australian Research Council Future Fellow, Professor of Quantum Physics at RMIT University, and Chief Investigator in the Australian Research Council Centre of Excellence for Nanoscale BioPhotonics. He is a theorist who's interests range widely, including Quantum Optics, Quantum Information, Diamond, Photoacoustics, imaging, and bees. Andy was a QEII Fellow at the University of Melbourne, and has postdoctoral experience at the University of Melbourne, University of New South Wales and the Open University. He completed his PhD under the supervision of Neil Manson at the Australian National University, and his undergraduate degrees at the University of Adelaide.