

QKD in South Africa

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Abstract

Through a R10 million research grant from the Innovation Fund, the Centre for Quantum Technology (CQT) was established at the University of KwaZulu-Natal in Durban in 2006. The Centre is the forerunner in Quantum Information Processing and Communication (QIPC) in Southern Africa. Its flagship project is the realization of secure quantum network on the optical fibre network of the City of Durban. The Quantum City network will be launched in October 2008.

A brief history of QIPC at UKZN

The Quantum Research Group at the University of KwaZulu-Natal was established in 2004 [1]. At the end of 2005 the Group was awarded a generous R10m grant from the Innovation Fund [2] to establish a Centre for Quantum Technology (CQT). In 2007 Quantum Information Science was officially recognized as Research Niche Area within the Institutional Research Development Plan of the National Research Foundation [3]. Quantum Information Processing and Communication is also identified as emerging technology in the National Photonics Initiative (PISA) [4]. In 2007 F. P. was awarded a South African Research Chair in Quantum Information Processing and Communication. The Quantum Research Group graduated the first Master student early in 2007 and will graduate the first PhD student this year.

The Centre for Quantum Technology

The Centre for Quantum Technology comprises three research units, namely a theoretical, a computational and an experimental one. Traditionally, the theoretical group has been investigating the general theory of open quantum systems [5]. The computational group has been involved in the development of algorithms for the simulation of open quantum systems. The 3d simulation of atoms in a double optical lattice is one of the flagship projects of the National Centre for High Performance Computing [6]. The experimental activities are concentrated around Quantum Key Distribution (QKD). The original aim of the Centre is to develop a low-cost efficient QKD solution. To this end single photon sources and detectors are being built in house. We are also investigating the potential of defects in diamonds as candidates for single photon sources as solid-state quantum computing.

Recently, we have started to focus on quantum networks.

Quantum City Project

The most ambitious project of the Centre is the realization of a quantum network on the optical fibre network of the eThekweni Municipality (City of Durban). The project has been sponsored by the City and is part of its Smart City initiative. On 25 July 2008 we realized the first QKD on the City's network. This was probably the first real life QKD on the African continent. The network will be implemented with equipment from IdQuantique [7] and Senetas [8] and will connect City buildings in Cato Manor, Pinetown and Westville. It will be launched at the SmartCity conference at the beginning of October [9].

References

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