Quantum Computation (484)
Quantum Physics and Concepts

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Overview

Topics we will cover in this course will include:

1. Basic Quantum Physics
2. Mathematical Structure
3. Quantum Cryptography
4. Quantum Circuit Model
5. [MBQC, TQC, etc.]
6. Quantum Teleportation
7. Gover's Search Algorithm
8. Shor's Quantum Factorisation
9. [Quantum Error Correction]

Practicalities

Two Lecturers

Herbert Wiklicky

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Teaching $4\frac{1}{2}$ weeks until 31 October
Open-book coursework test on 27 or 31 October

Mahdi Cheraghchi

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Teaching $4\frac{1}{2}$ weeks from 3 November
Open-book coursework test on ?? November

Exam: Week 11, 12 December 2016, 2 hours (3 out of 4).

Different classes, different background, different applications.

Text Books

- Noson S. Yanofsky, Mirco A. Mannucci: Quantum Computing for Computer Scientists, Cambridge University Press 2008
- Michael A. Nielsen, Issac L. Chuang: Quantum Computation and Quantum Information, Cambridge University Press 2000
- Phillip Kaye, Raymond Laflamme, Michael Mosca: An Introduction to Quantum Computing, Oxford 2007
- N. David Mermin: Quantum Computer Science, Cambridge University Press, 2007
- A. Yu. Itaev, A. H. Shen, M. N. Vyalyi: Classical and Quantum Computation, American Mathematical Society, 2002

Electronic Resources

Introductory Texts

- Abbas Edalat: Quantum Computation
  `http://www.doc.ic.ac.uk/~ae`
- Noson S. Yanofsky: An Introduction to Quantum Computing
  `http://arxiv.org/abs/0708.0261`

Main Preprint Repository

- arXiv `http://arxiv.org`

Physics Background

- Chris J. Isham: Quantum Theory – Mathematical and Structural Foundations, Imperial College Press 1995
- Richard P. Feynman, Robert B. Leighton, Matthew Sands: The Feynman Lectures on Physics, Addison-Wesley 1965