

Quantum Communications book announcement

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Quantum Communications draft now available!

- In-progress undergraduate textbook
- Primary authors Michal Hajdušek, Rodney Van Meter; contributions from a growing team
- Being released Creative Commons (CC-BY-SA)
 - <https://github.com/sfc-aqua/Overview-of-Quantum-Communications-E>
 - <https://www.dropbox.com/t/zQzapjhlHKkTBHmz> (temporary link to PDF)
- Companion to the online course “Overview of Quantum Communications”
 - <https://www.youtube.com/c/QuantumCommEdu>
- Supported by Q-Leap Education project
 - <https://qacademy.jp/en/>

Contents & Focus

- ~300 pages
- Includes exercises, but contributions welcome!
- Indexing, boilerplate, notation, etc. still WIP
- Aimed at 2nd or 3rd year undergrads, after first, introductory quantum information processing course
- Math background: vectors, linear algebra, discrete probability, complex numbers

Contents

Quantum Mechanics for Quantum Communication

- Introduction
- Quantum States
- Pure and Mixed States
- Entanglement

Fundamentals of Optics

- Coherent Light and Single Photons
- Interference
- Waveguides

Quantum Communication Protocols

- Teleportation
- BB84: Single-photon QKD
- E91: Entanglement-based QKD

Fundamentals of Quantum Repeaters

- Long-distance Communication
- Quantum Repeaters
- Physical Layer Components

Quantum Repeater Systems

- Entanglement Revisited
- Quantum Internet

Feedback welcome!

- https://docs.google.com/forms/d/e/1FAIpQLSfvaBIT3q6pBERR3xt84WLvIsipVclH-2w8P2ad9KYS72e8LA/viewform?usp=sf_link
- Or Github Issues or pull requests at <https://github.com/sfc-aqua/Overview-of-Quantum-Communications-E>