Spring 2002
PHYS/EEE 532 Term Paper

Each student is expected to do an independent study on a subject related to Quantum Computation and Information, write a term paper on it, and give an oral presentation in class in the final week of the semester. The papers are expected to be in the style of a survey that covers the entire area chosen. You are expected to read all major papers in the chosen area. The term paper must include a thorough bibliography and bibliographic remarks on the contribution of each paper.

Some possible topics for term paper are listed below. You may propose other topics.

1. Physical implementation of quantum gates.
2. Landauer's principle and reversible computation (classical and quantum).
3. Solovay-Kitaev theorem on circuit approximation.
4. Survey of Shor's algorithm and related results.
5. Survey of Grover's algorithm and related results.
6. Properties of von Neumann entropy (Lieb's inequality).
7. Quantum measurement theory.
8. Entanglement generation and distillation.
9. Survey of quantum error correction.
10. Survey of quantum key distribution protocols.

The timetable for term papers is as follows.

- 12.03.2002 Submit a proposal for term paper. The proposal should list the title of the subject, a 100 word explanation of what the subject is about and what you intend to do on that subject, and a list of papers or book chapters that you propose to read.
- 22.03.2002 Finalization of term paper subjects.
- 26.04.2002 Progress report on the term paper. This may be a draft of the term paper.
- 17.5.2002 and 21.5.2002 Oral presentation of term papers. Each presentation will be 20 minutes and you will use the overhead projector.
- 27.5.2002 Term papers due. Term papers should be written preferably with Latex/Tex. They should be about 10-20 pages long and written in the style of a survey paper. Use 1.5 spacing. Use figures and tables for clarity. The papers should be concise in that you do not need to rewrite proofs of mathematical results but still give sufficient detail to explain the subject matter to an expert audience. Consult the instructor if you are unsure about the style.