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2013

**PH4992, Special Topics in Advanced Physics:  
Quantum Computing.**

Huffmire, Ted; Luscbome, Jim

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Ted Huffmire and Jim Luscbome, PH4992, Special Topics in Advanced Physics:  
Quantum Computing. Naval Postgraduate School, Monterey, CA, Summer 2013.  
<https://hdl.handle.net/10945/36690>

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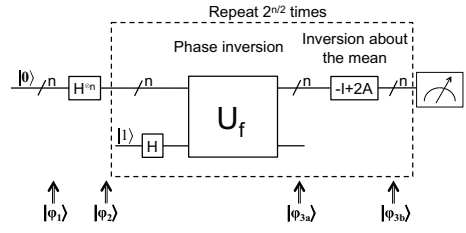
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# COURSE ANNOUNCEMENT



## CS4670/PH4670, Quantum Computing, Summer 2013

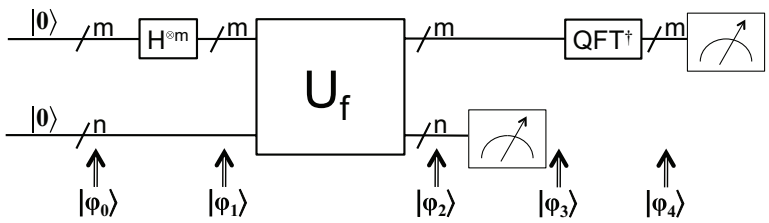
### Course Description:

This inter-disciplinary survey course explores the evolution and current direction of quantum computing technology. Topics include quantum circuits, quantum algorithms (including factoring and search), and quantum key distribution. You will learn to think critically about the tradeoffs of this evolving technology. Prerequisites: familiarity with basic notions of computing, quantum theory, and linear algebra, consistent with the material covered in CS3000, PH2652, MA3042 or PH3991.

### Date, Time, and Location: TBD

### Instructors:

Ted Huffmire (Computer Science)  
Jim Luscombe (Physics)



### Grading:

Student Project, 60%  
Class Participation and Student Presentations, 40%  
A student presentation is required on a topic taken from the articles listed at the end the syllabus, or equivalent, with consent of instructor.

### Recommended Textbooks:

Yanofsky, Quantum Computing for Computer Scientists  
Blümel, Foundations of Quantum Mechanics

### Topics:

- History
- Foundational physics of quantum computing
- Quantum circuits
- Quantum algorithms
  - Deutsch's Algorithm
  - Deutsch-Jozsa Algorithm
  - Grover's Algorithm
  - Shor's Algorithm
- Physical implementations of quantum computers
  - Superconducting Josephson Junctions
  - Nuclear Magnetic Resonance
  - Ion Traps
  - Quantum Dots
  - Linear optics
- Quantum error correction
- Quantum computer architecture
- Quantum key distribution

