Introduction to Quantum Computing
Phys 419, Autumn 2022. Instructor: Boris Blinov

Syllabus:

- Brief review of quantum mechanics; qubits and their representations. Entanglement.
- Quantum logic gates.
- Quantum computing architectures.
- Quantum algorithms.
- Physical realizations of qubits.
- Quantum information.
- Cryptography, quantum key distribution; teleportation.
- Error correction, fault tolerance.

Prerequisites: Phys 225 and Phys 227.

Textbook: "A Short Introduction to Quantum Information and Quantum Computation" by M. Le Bellac (Cambridge University Press, 2006).

Lectures: Twice a week, in-person. All lectures will be recorded.

Homework: Weekly, graded. Submitted online, via Canvas dropbox. Only best 5 out of 7 or 8 HW assignments will be counted towards the final grade. NO LATE HW will be accepted.

Exams: Midterm exam in-person.

Course paper: Final project (a review paper on a Quantum Information Science topic) due at the end of the quarter.

Course grade is 40% HW + 40% exam + 40% final paper = 120%.