Physics 492: Quantum Mechanics II
Final Project
Due May 9, 2019

In recent years, a number of experiments have been performed that test or demonstrate some fundamental aspect of quantum mechanics. As a final project, your task is to review such a modern *experiment* in an area of interest to you. Your task is the following:

- Review the underlying idea and goal of the experiment and what is being tested/demonstrated.
- Explain the theory that underlies the experiment. Use sufficient math to describe and support the theoretical description.
- Explain how the experiment was done, the results, and how it demonstrates the fundamental aspect of quantum.
- Discuss the outlook for further work to be done and outstanding remaining questions.

Some example topics include:
- Wave-particle duality
- Heisenberg's microscope
- Entanglement and violation of Bell's inequalities
- Quantum cryptography
- Quantium logic gates and quantum computing
- Quantum coherence in photosynthesis
- Measuring the Wigner function of a Schrödinger cat
- Contextuality in quantum measurement
- Decoherence
- Trapping and atomic ion

This is not an exclusive list. I can help guide you to appropriate papers.

You paper should be 5-6 pages long (12 point font, 1 inch margins), include appropriate references. Figures can be taken from the literature with appropriate references. The format should include a title, abstract, the following sections: I. Intro, II. Theory, III. Experiment, IV. Outlook, and references. You can use any word processing program you like (Latex, Word, etc.). You need to typeset math.

Key Dates
- Propose topic and key references to me via email by **April 11**.
- I will approve and make suggestions by **April 14**.
- Final manuscript to me via email by **May 9.**