Quantum World (Phys 150)  Possible Final Paper/Project Topics

The term paper or project for this class is due on Friday May 1, 5:00 PM. For those choosing to do a term paper, the suggested length is 2500 words, although longer papers will be accepted, if the discussion warrants a greater length. The paper should be properly referenced, and will typically require reading of a number of supplementary references; the citations will form part of the basis for grading.

For those choosing to do a group project, if the project involves a “performance” aspect, the project will be presented to the class on Friday May 1. An annotated bibliography of your properly cited references will be required for group projects.

Please come to see me to have your topic approved.

This list of topics is not meant to be exclusive, but to give you some ideas of what could be done.

- New Experimental tests of the Bell Inequalities
- The Many Worlds Interpretation
- Quantum Cryptography
- The Copenhagen interpretation - is it adequate?
- Ensemble Interpretations
- Zeilinger’s Quantum Information approach
- Logical Positivism and the Quantum Theory
- Quantum Computing
- Quantum Teleportation
- The Role of Human Consciousness in Physics
- Pilot Waves and other non-local Hidden Variables Theories
- Could Reality be entirely Mathematics?
- Quantum Theory and Epistemology: parallels with the philosophy of Kant, Hume, etc.
- Free will vs. determinism: what does Quantum Mechanics tell us?
- Comparative reviews of one or more of the ‘popularizations’ of quantum mechanics:
  - The Quantum World  J. Polkinghorne
  - QED: The Strange Theory of Light and Matter  Richard Feynman
  - The Cosmic Code: Quantum Physics as the Language of Nature  H. Pagels
  - In Search of Reality  B. Despagnat
  - In Search of Schrödinger’s Cat  J. Gribbin
  - Quantum Enigma: Physics Encounters Consciousness  B. Rosenblum and F. Kuttner
  - Are Quanta Real?  J.M. Jauch
  - Quantum Reality  Nick Herbert
  - Paradox Lost  P. Wallace
  - Quantum Physics and Theology: An Unexpected Kinship  J. Polkinghorne

(over)
– The Tao of Physics  Fritzof Capra
– The Dancing Wu Li Masters  Gary Zukav
– The Unconscious Quantum: Metaphysics in Modern Physics and Cosmology  Victor Stenger
– Quantum politics : applying quantum theory to political phenomena  Ed. Theodore L. Becker
– Interpreting the quantum world  Jeffrey Bub
– Taking the quantum leap : the new physics for nonscientists  Fred Alan Wolf
– Einstein, Bohr and the Quantum Dilema  Andrew Whitaker
– etc.