

Midterm Paper

Phil 146 Philosophy of Physics

Prof. Christian Wüthrich

due: 14 February 2013

Instructions

Pick one of the following topics. Write a paper of 8-10 pages (double-spaced, typed, one-inch margin, normal font size, etc.) discussing the chosen topic. In addition, add one page detailing the references. (No internet references unless it comes from a legitimate refereed source.) Your response essay must be clearly structured, precisely worded, validly argued, and diligently spell-checked. Be as concise as possible without compromising clarity.

There are some additional rules to keep in mind, as specified on the syllabus. The deadline **14 February 2013 at the end of class**. For each day your paper is late, five points will be deducted from your point total, although no negative point totals will be given for the midterm papers. The midterm paper must be submitted **both as hard copies as well as through <http://www.turnitin.com> by the due date** in order to earn credit. You must enroll at <http://www.turnitin.com> by creating a new profile. You will need the following course information:

Class ID: 5851075

Enrollment Password: phil146wi13

Note the difference between lower case ‘l’ and the numeral ‘1’. If you have any problems with using <http://www.turnitin.com>, you can contact the Instructional Web Development Center of Academic Computing Services at 858-822-3315 or iwdc@ucsd.edu.

Topics

1. Quantum mechanics and classical mechanics differ crucially in how they represent three key physical concepts: the *state* of a physical system, the *properties* of a physical system, and the *values* of the properties of a physical system. Explain what these concepts are, how quantum mechanics and classical mechanics differ in representing them, and some of the consequences of this difference.
2. Revisit the debate between Einstein and Bohr. Give a detailed account of what their disagreement was and evaluate their positions.
3. Outline the Bell non-locality theorem, and discuss its implications for the 1935 Einstein-Podolsky-Rosen incompleteness argument.
4. What is the measurement problem? Are Fuchs and Peres right that there is no problem after all?
5. What is the measurement problem and how is it connected to the linearity of quantum mechanics? How successful are collapse theories at resolving the problem through the introduction of non-linearity? Obviously, in order to be able to discuss this topic, you will need to read ahead a bit.