

## **Guidelines for Final Paper and Oral Presentation**

Physics 404: Introduction to Quantum Optics and Atomic Physics

You and a fellow teammate will pick a calculation in one of the papers that we have read or in a paper on AMO physics that is related to what we have studied in class. Your calculation must elucidate some steps that are not readily apparent from the text of the paper (i.e. it cannot be trivial) – you *must* check with the instructor whether your calculation is appropriate. Problem #2 of the week 6 homework that relates the Monte Carlo wavefunction method to the density matrix method is an example of an appropriate level for a calculation. If the calculation is related to your senior research, then that is an added benefit. You will present this calculation in the form of a paper and an oral presentation. The purpose of this exercise is not to produce original research, but to provide you with experience and skills in presenting scientific results.

### **Paper**

You will write a 2-3 page paper in the format (i.e. font sizes, margins, column width, layout, etc ...) of Optics Letters or Physical Review Letters. You are encouraged to use the Latex Style package though this is not a requirement (MS Word is also acceptable):

[http://www.opticsinfobase.org/ol/submit/style/jrnls\\_style.cfm](http://www.opticsinfobase.org/ol/submit/style/jrnls_style.cfm)

<http://authors.aps.org/revtex4/>

The paper will read as though it is from Optics Letters or Physical Review Letters: it must have a summarizing abstract, a motivating introduction that clearly states the importance of the calculation, and its broader impact in the context of AMO physics and other disciplines. The body of the paper should discuss the context of the calculation, introductory material, assumptions, the calculation and related derivations. Importantly, the paper should include at least one figure that helps explain the calculation or its importance or application to some closely related topic. More figures are encouraged. If you can explain something (concept, data, results, etc ...) with a figure rather than words, then the figure is generally a better choice. Frequently, scientific papers are written by first picking the appropriate equations and figures since these are the key points that one wishes to make, and then adding the text to explain them. The paper should include a list of relevant references to support any claims that are made.

An outline of the paper with figures (in near final format) is due exactly one week before the oral presentation. A rough draft of the paper is due when you make your oral presentation. The final version of the paper is due on the last day of class.

### **Oral presentation**

You will give a 12 minute oral presentation on your calculation in which you will summarize the contents of your paper. You should use PowerPoint for the presentation, though blackboard work is also permitted. *All* audience members will be expected to ask at least one question. Both team members should speak "equally". The oral presentations will be made on the Monday of the last week of class.