

**1. Prepare an outline of your paper/talk/project. The outline must include all of the following:**

- a) the topic. b) whether you want to do option A, option B, or option C.
- c) an outline of material you plan to cover
- d) several references you plan to use (THIS IS IMPORTANT AND IS THE MAIN WORK) **NOTE: you must use references besides websites.** The references should be specific, that is, title and date of magazine article, page numbers, etc. You should only include references you have actually looked at!
- e) the level of the presentation (i.e. lay public, physics majors, 4th grader, etc.)

[Note: you will not be locked into the topic, level etc. that you state in this homework. This homework is to make sure you pick an appropriate topic and have found appropriate references. If you wish to change latter, just let me know.]

### Suggestions

Go to the library or online and look at Scientific American, Physics Today, Physics World, Sky and Telescope, etc. If necessary, ask the information librarian how to search these for articles on specific topics. These are the best sources. You can look at these journals online if you know how. Note that wikipedia and such web sites alone are NOT sufficient, but of course you can get some information from them. (You may use the online versions of journals or textbooks however). **BE CAREFUL OF THE QUALITY OF YOUR SOURCES.** You should start this assignment early, so you have time to learn how to do this type of research, and try several approaches. If you start the day before the assignment is due you will probably not succeed. You need several references, not just one or two. Popular books on science, and textbooks can also be good sources, depending on the topic. These are also available at the library.

### Description of Final

40% of the grade will be on the final paper/talk. You must attend the final talks. You chose one of the following options:

**Option A:** Review paper (7-10 page paper)

**Option B:** Review talk/short paper (10 minute talk plus short paper)

**Option C:** Calculation with talk/written presentation

Physics and Engineering majors typically do not get enough training in written and oral communication, though this will likely be required in any job in industry or academia. So the written portion of the final should be very carefully checked for clarity, grammar, spelling, etc. I will be grading hard on the mechanics of your writing.

For Option A, the idea is a Scientific American level paper clearly explaining to an intelligent lay person some exciting topic in modern astrophysics. (Alternatively you may pick a different level, but you must tell me what that level is.) The goal of the paper is to get the reader interested in the topic, to maintain his/her interest throughout the paper, to explain things at a level they can understand, and at the same time to be scientifically accurate. This is not an easy task.

I will be looking for:

- \*How well you understood the subject you picked,
- \*How well you expressed yourself; i.e. could the reader/listener follow?
- \*is it interesting?
- \*How well you maintained a consistent technical level
- \*Grammar, spelling, presentation, etc.
- \*Scientific correctness.

**Note, the paper must be written entirely in your own words; copying any portion of your paper from anywhere else is not allowed (except for short passages that should be explicitly quoted and properly attributed). This includes copying from work you previously turned in for other classes!**

For option B, the goal is similar but the talk will be given to the class, with the written part being your working outline/presentation notes. The talk must be well rehearsed and well organized. 10 minutes is a very short time to get across the essence of any topic, so I recommend preparing your material, then giving the talk out loud to yourself keeping track of time, then redoing the the content and technical level of the talk to fit in the allowed time. We will have time for about 12 talks; if too many people want talks I will chose the ones to be presented by a lottery, and let you know when handing back this assignment.

The paper or talk may be on any topic relevant to the class, but it should be something you are interested in. You can get the information from books or magazines in the library, from your textbooks, from the internet, or from any other sources. (Be careful with the internet; there is much wrong information there, and you will be graded down if you report it!) I recommend looking through these to find a topic that interests you. When you have picked a topic, you can ask me for recommendations of where to find appropriate information.

For option C, you will give a paper or talk as above, but rather than review some subject, you will present the results of a calculation. Some examples: Computer solution of light bending and/or gravitational lensing, perhelion advance of mercury, fuller calculation of some class topic that we skipped over quickly, etc.