

## Homework Assignment #5, Explaining Physics Concepts to People who Know Less Physics than You Do

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### *N.B. This assignment will be peer-reviewed (HW #6).*

The purpose of this assignment is to give you practice in explaining scientific research in a way that is clear, concise, and meaningful for non-experts. You'll read a recent paper by one of our faculty and then write a news story about it. For this assignment, your audience is non-scientists who have a general interest in physics and may have taken introductory physics in college but have no specific knowledge of the physics research you will describe.

First select one of the papers on the next page. You should choose a paper where you have a solid grasp of the physics; the point of this assignment is to communicate that understanding to a general audience, not necessarily to learn some new physics. Read the [great advice](#) from Professor Mason before you start writing, and look at [UI News Bureau stories](#) for examples of this style of science writing.

Each of the papers on the list has been written recently by a member of our faculty. We recommend that you talk to a postdoc or a graduate student in the research group for additional insight about the work being reported in the paper. (Look at the author list and the affiliations to see who might be here in the department and then use the [campus directory](#) to find contact information for that person.)

### *This assignment consists of two parts, each having a separate due date.*

#### **PART A: Due Friday, February 28, 9:00 p.m.**

Based on the February 21 lecture, write a five-sentence synopsis and full-sentence outline for your story. The synopsis should state the goal of the research, how it fits into the context of other work, what method was used, what were the primary results, and what conclusions the authors reached. Remember that each sentence in your outline will equal about one paragraph in your story, and you are limited to three pages total, including and figures and references. Thus, you should have no more than eight to ten sentences in your outline. The synopsis and outline will not be formally graded, but you will receive feedback to help you strengthen your final paper.

#### **PART B: Due Friday, March 6, 9:00 p.m.**

Based on the February 28 lecture, expand your outline into your full paper. Remember your audience! Make sure the language and the figures that you use will be understandable to a non-specialist audience.

Your paper, which should be no more than three pages, including text and figures, must contain the following six elements:

1. An engaging title.
2. A “byline”—your name, the date of the article, and the place where the article was written, e.g., Urbana, Ill. See <https://news.illinois.edu/view/6367/805238> for how to do the byline.
3. A strong opening to capture the audience's interest.
4. A single main idea, conveyed in laypersons' language (no jargon, no arcane technical terms, no equations). You cannot cover every aspect of your chosen paper in this assignment. Pick out one element (how the work was done, what new was discovered, what the results *mean*, how the discovery will affect future work in the field, why the researchers undertook the work) and make your story about that main idea.
5. At least two illustrative images, with appropriate credit given to the sources. The figures should be understandable and meaningful to a general audience (i.e., no complicated plots). You do not

have to create these figures yourself, but you must credit the original authors and identify the source of the figures. You must also provide your own, original captions to explain the figures.

6. At least four embedded hyperlinks\* to related, supplementary material that the audience can use to learn more about your topic. Links should be to content appropriate for the intended audience—no links to technical papers.

**Email your assignments** to [phys496@physics.illinois.edu](mailto:phys496@physics.illinois.edu). Be mindful of your reviewers and get Part B submitted by the deadline, so they have adequate time to complete their reviews. Assignments submitted after the deadline will have at least 20 points deducted and will be ineligible for rewrite points.

Total—150 points; 50 points on the accuracy of the physics, 50 points on how well you pitch your story for your audience, and 50 points on clear, concise writing.

### **List of Papers:**

M. Shankla and A. Aksimentiev, “Conformational transitions and stop-and-go nanopore transport of single-stranded DNA on charged graphene,” *Nature Communications* **5**, 5171 (2014).

Y. Alexeev et al., “Quantum Computer Systems for Scientific Discovery,” arXiv:1912.07577 (11 pp.) (Brian DeMarco is a co-author)

Zeljko I, Walkup D, Assaf BA, Scipioni KL, Sankar R, Chou F, Madhavan V, Strain engineering Dirac surface states in heteroepitaxial topological crystalline insulator thin films, *Nature Nanotechnology* volume 10, pages849–853(2015), doi: 10.1038/nnano.2015.177.

J B Reeves, B Gadway, T Bergeman, I Danshita and D Schneble, Superfluid Bloch dynamics in an incommensurate optical lattice, *New Journal of Physics* 16, (2014)

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\* See <http://www.gcflearnfree.org/word2010/13.2> for instructions on how to insert a hyperlink in a Word document.