

Physics for future Presidents

Department of Physics, Carnegie Mellon, Fall '19, Deserno

Homework 5, *draft* due in recitation on Thursday, Sep 19th;
finalized essay due the next day, in the lecture on Friday, Sep 20th

Physics in the movies

Science fiction movies and action movies often show things that don't fit in easily with the laws of physics. Physics majors often make it a "hobby" (or obsession?) to identify these. But the issue *does* have a serious aspect: In the absence of wide "scientific literacy" some people might (unconsciously) shape their ideas about physical principles based on the sometimes breathtakingly inaccurate descriptions presented in movies. In that respect, such movies (inadvertently) impede a better understanding of physics.

Find examples of such instances and discuss them. To be on the "safe side", you might want to restrict yourself to fields of physics and science that we have already talked about, but you don't have to; yet, the current chapter 3 offers ample opportunities. Here are some of the points that you might want to address:

- What physical principle is violated?
- How can we tell that something is going wrong?
- Would there have been a way to "save the physics" without sacrificing the story line?
- Would the correct physics have made an equally nice (maybe even better) story line possible? (Don't get carried away here, this is not a screenwriter's course!)

Remark 1: In his book "The physics of superheroes" the author James Kakalios makes it clear that a superhero gets a "miracle exemption". Yes, we all know that superman violates a bunch of physics principles, but he's *superman* after all. However, when superheroes interact with the rest of the ordinary world, the laws of physics ought to hold. For instance, he might be strong enough to pick up a building, but that wouldn't help much, because that building would crumble into bits and pieces. (Why? Because buildings haven't really been designed to be picked up.) In line with this remark: Should you write about superheroes, give them a miracle exemption, but don't give the rest of the universe an exemption as well!

Remark 2: It might help us to understand your essay better if you included a brief description of the scene you're writing about. We haven't seen all the movies Hollywood ever produced, and thus appreciate the orientational help. This brief summary (one short paragraph) will *not* count towards your one page limit.

Remark 3: Don't *completely* forget that this essay is a physics assignment.