Intermediate Lab

PHYS 3870

Lecture 8

Oral Presentations

Oral Preparation for PHYS 3870

- We will meet as a group on Monday Nov 23 at 12:00 in SER 244 for about 20 minutes to discuss to oral presentations for the final experiment.
- Will go over formatting and presentation issues, share a couple examples and answer questions.
- You can sign up for a time slot for your presentation at this meeting. Other times outside Dec 9 can be arranged then.

- We will meet on Wednesday December 9 (the last day of class) as a group to go over the presentations. Other times will be scheduled at our Nov. 23 meeting.
- You should prepare one presentation for the group.
- We will project the presentations on the large screen. Each group will have:
  - 10 min for presentation,
  - 5-10 minutes for discussion and questions from the audience. This will include comments from the instructors and peers on both content and presentation.
- Do not overrun you time allotment. We are on a tight schedule.
- Please submit your presentation by the morning of the presentation so I can print out a copy to make notes on for feedback.
- Please plan on attending the full session. You will learn a lot critiquing other presentations.

Preparation of a Talk

Here are some comments on the oral presentation:

- **The first bit of advice: Consider your audience!!!**
- **Practice your talk with your partner a couple of time before your class presentation to get the content and timing down. Presentations done without rehearsal are invariably clumsy and ill timed. This is especially true of joint presentations. Lack of practice will most likely be reflected in your grade.**
- **I expect both partners to contribute equally to both the presentation preparation and the delivery. This can be a bit tricky, especially without practice. Be sure to take this in to account in your preparation and practice.**

- **Presentations can be done in any format you like.**
  Powerpoint presentations (or equivalent programs) are the most common format.

- **An alternative program for presentation delivery is Prezi (see https://prezi.com/desktop/).**
  This makes for some nice visual effects, which can be both impressive and useful. You should exercise caution though, as these presentations can be a bit dizzying to the audience if you are not familiar with use of Prezi. Prezi presentations also have a distinct disadvantage in that they are hard to share with others and are not good for archival documentation of your work or for "borrowing" slides for future presentations.

Format of a Talk

- **A rough rule of thumb: ~ 1 slide (or Prezi screen) per minute.**
  This is not a hard and fast rule, but provides a good guideline.

- **Your slides and accompanying words do not have to be identical.**
  - **Reading information directly from slides is not an effective presentation style. (Sometimes I will do this on the first slide, however, just to get rolling.)**
  - **Better to use figures, graphs, photographs and bullet lists to summarize the concepts, with supporting words and details presented orally.**
  - **Sometimes you can display detailed numbers or equations for the listener/reader to look at while you talk in broader terms.**
  - **Generally, a bad idea to read exact numerical values or lengthy equations, which the listener will neither absorb nor remember.**

- **More is less (advise I could do well to heed better)**

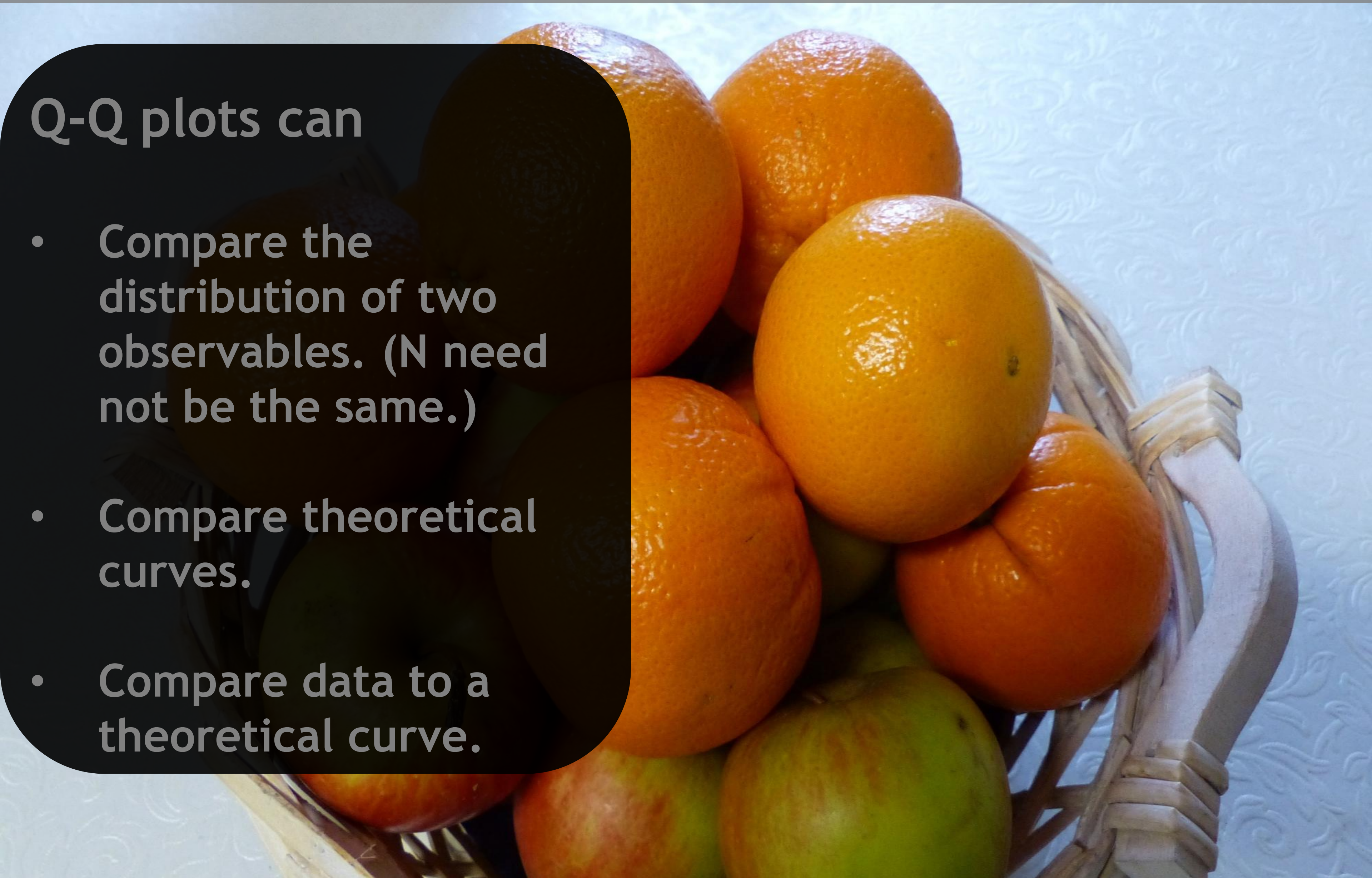
- **Avoid complicated backgrounds or slide content. Hard for listeners to absorb the information.**
- **Be conscious of your color schemes;**
- **I suggest you project your slides on a screen like the one you will present on and review the slides from the back of the room.**

Content of a Talk

Your presentations you might have:
(of course this is just an approximate guideline)

- **Title slide,**
- **Basic physics concepts underlying your experiment (1-2 slides),**
- **Theory (1-2 slides).**
  Do not get bogged down in detailed equations. Rather use equations almost as illustrations to show the important parts of physics that go in to deriving your results. Be sure you clearly state your proposed model (and assumptions).
- **Experimental methods (1-2 slides).**
  Diagrams and overviews are best.
  Sometimes there can be interesting quirks you found that make this interesting.
- **Results (1-3 slides). Go for summary tables and graphs. Do not focus on numerical details. Roll data analysis into these slides as much as possible.**
- **Error analysis and how well your proposed model matched your results. (1 slide)**
  (Did I mention I like error analysis? Actually, what I really like is a QUANTITATIVE assessment of how well your model describes your results and how certain you are in your results.)
  A discussion of the magnitudes of the various errors and there relative contribution—and perhaps how to fix them in a future attempt of the experiment—are useful.
- **Summary of your results (1 slide)**
- **Summary of the physics conclusions you can draw from comparison of your model with your experimental results and how these conclusions can be extended to other physics problems (1 slide)**

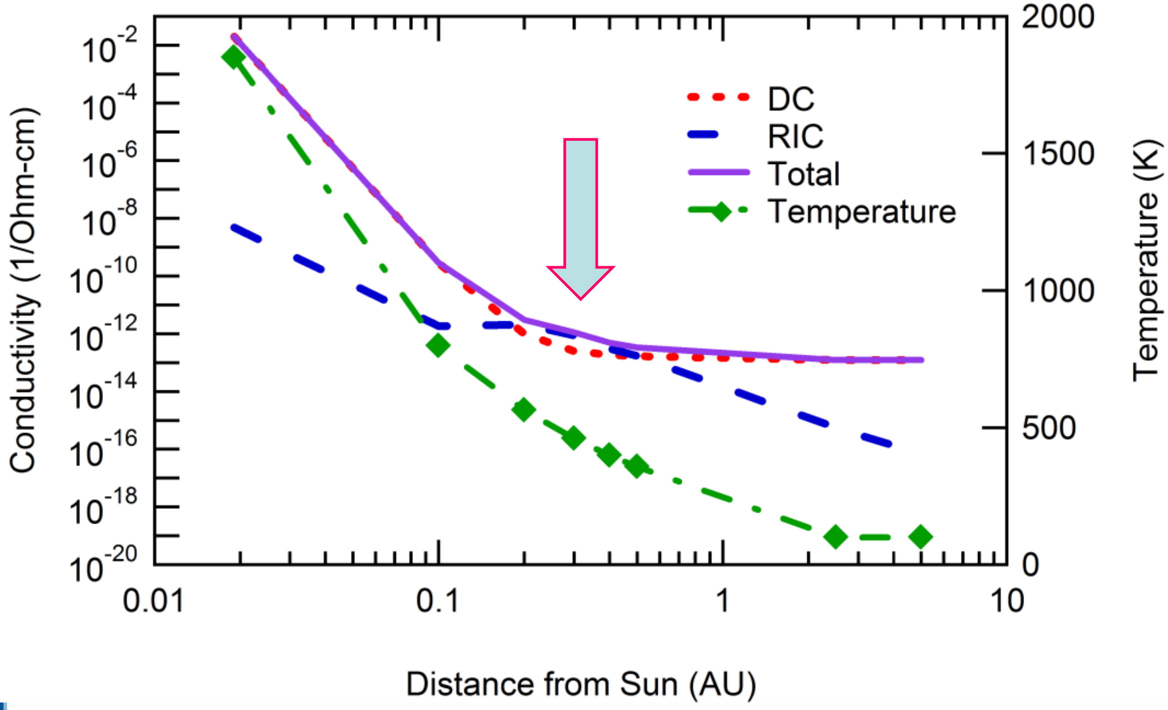
How can I tell if two things are related?



Q-Q plots can

- Compare the distribution of two observables. (N need not be the same.)
- Compare theoretical curves.
- Compare data to a theoretical curve.

Case V: Temperature and Dose Effects



General Trends

Dose rate decreases as ~r^{-2}
T decreases as ~e^{-r}
σ_{DC} decreases as ~ $e^{-1/T}$
σ_{RIC} decreases as ~ $e^{-1/T}$ and decreases as ~r^{-2}

A fascinating trade-off

- ***Charging increases from increased dose rate at closer orbits***
- ***Charge dissipation from T-dependant conductivity increases faster at closer orbits***

Extension to Flux Energy Distributions

For energy independent flux densities

electrons ions photons

$$0 \overset{?}{=} [\delta + \eta - 1] \cdot N_e + (1 + \sigma_{Ion}) \cdot N_{Ion} + \sigma_{Ph} \cdot N_{Ph}$$

Weighting for energy dependant flux densities (#/m^2-s-eV)

$$\int N_e(E_e) \cdot dE_e \overset{?}{=} \int [\delta(E_e) + \eta(E_e)] \cdot N_e(E_e) \cdot dE_e + \left\{ \int [1 + \sigma_{Ion}(E_i)] \cdot N_{Ion}(E_i) \cdot dE_i \quad + \int \sigma_{Ph}(E_{Ph}) \cdot N_{Ph}(E_{Ph}) \cdot dE_{Ph} \right\}$$

electrons in electrons out ions in photons in

- Determines net charge
- Separates environment and materials effects (mostly)
- Positive charging terms ranked in importance:
  - Ion effect usually small
  - Photon effect often dominates in sunlight
  - In eclipse, driven by δ+η

Help with Talk

- I have set out several books on delivering scientific presentations on the chair outside my office. I encourage you to look through these. There are some good ideas and discussions of presentation style specific to scientific talks. Please do not take these outside my office alcove, so that other students will be able to access them as well.

- I would be happy to talk with you about the content or delivery of your presentations. I would even be happy to look over your draft presentations. Please feel free to bug me as much as you like.

Testing a Model?

- Steps in a Scientific Investigation [Baird, Ch. 5-3]
  - Clearly Identify:
    - The problem or question or interaction to be addressed.
    - The system to study and its boundaries.
    - The significant variables in observation—key is to set up experiment with isolated input and output variable(s)
  - Develop a model of the system—key is to quantitatively describe interaction of inputs with system (see below).
  - Test the model through experimentation—key to designing experiment is whether data will allow quantitative evaluation of model for given input variable(s) and output variable(s) [see Baird, Ch. 5 on Experimental Design]
  - Evaluate the model as a description of the system—key is to know how good is "good enough" and how to test this quantitatively [see Baird Ch. 6 on Experiment Evaluation]
  - Refine the model to cover:
    - More precise measurements
    - More general conditions
- Basic approach to develop and evaluate the usefulness of a model [Baird, Ch 4.1].
  - Know data and uncertainties (presumably)
  - Use this to identify system, inputs and outputs
  - Now develop a model
  - Then test model by comparison with data (first qualitatively, then quantitatively)