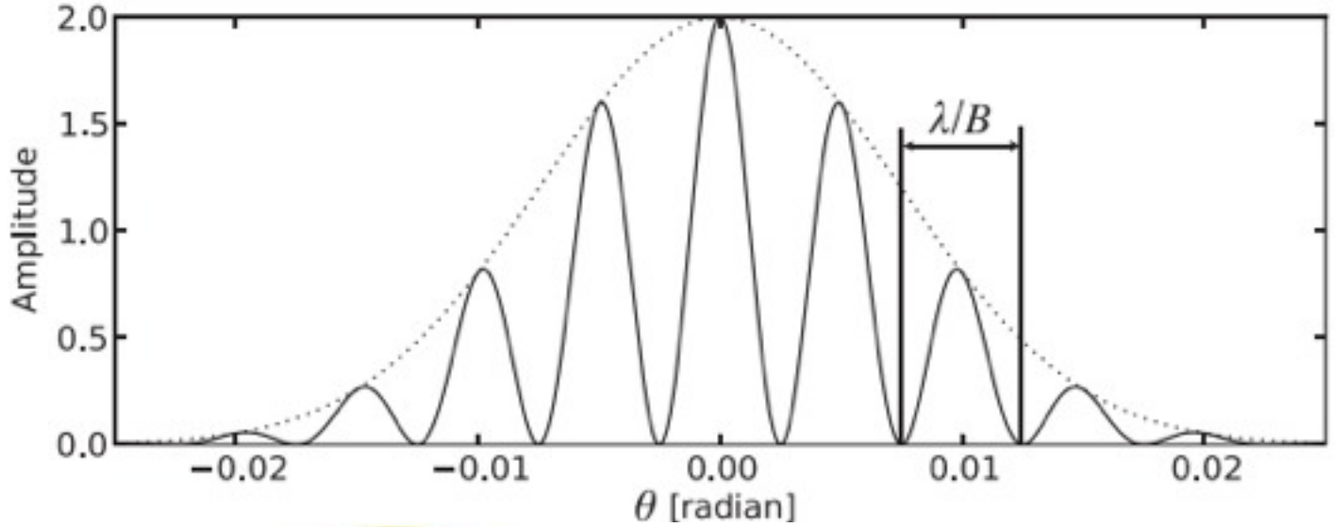
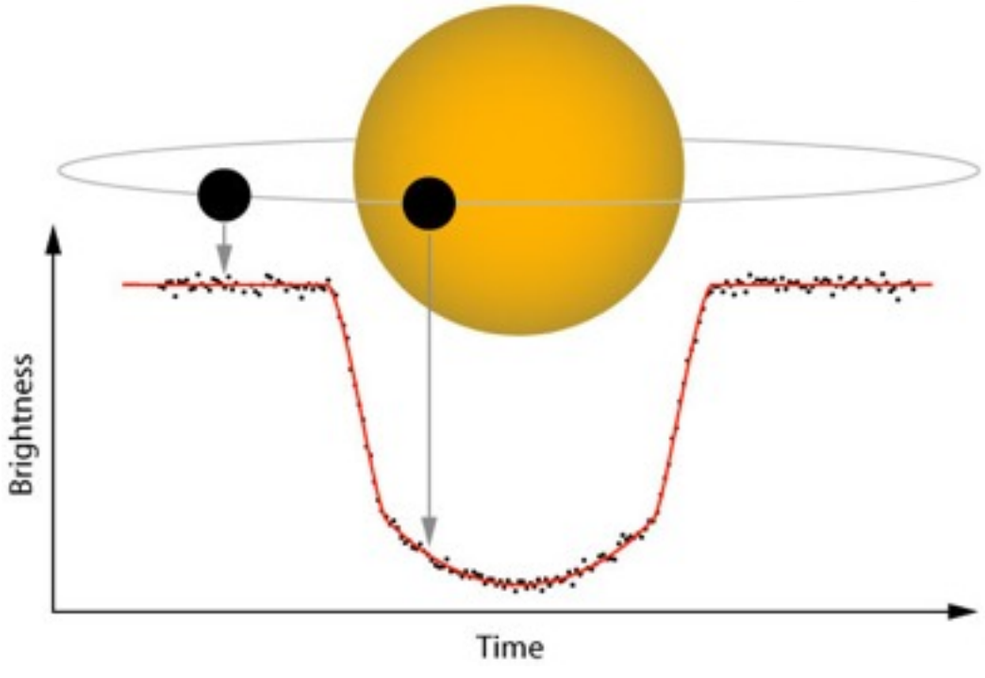
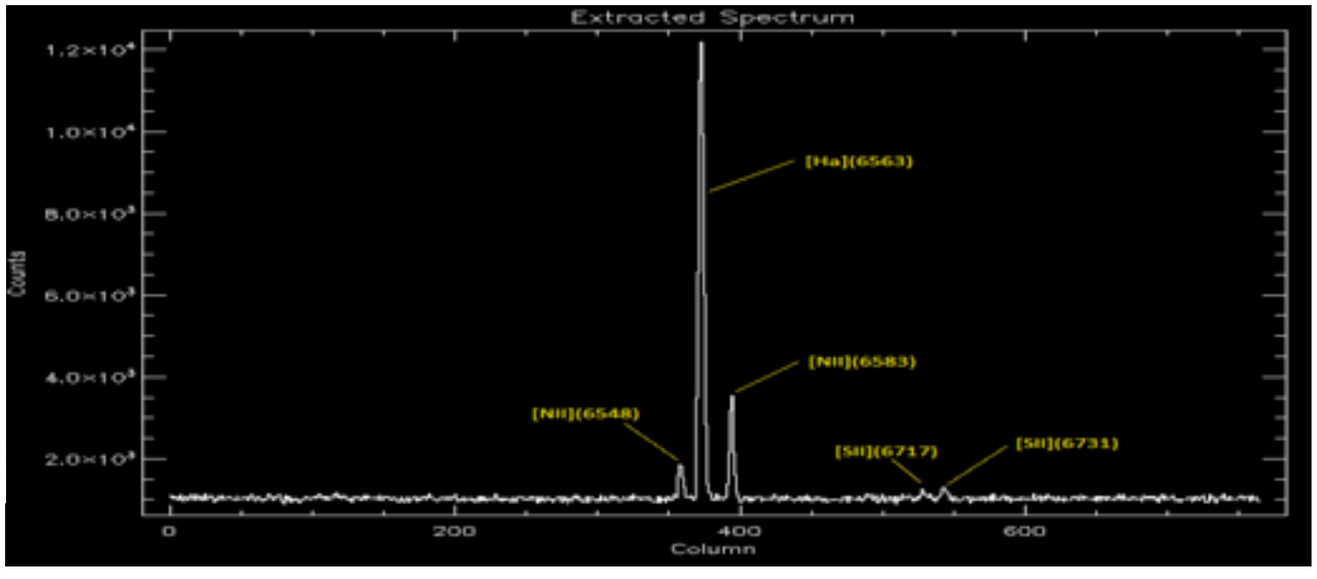
PHY 517 / AST 443:
Observational Techniques in Astronomy

Fall 2016, Anja von der Linden

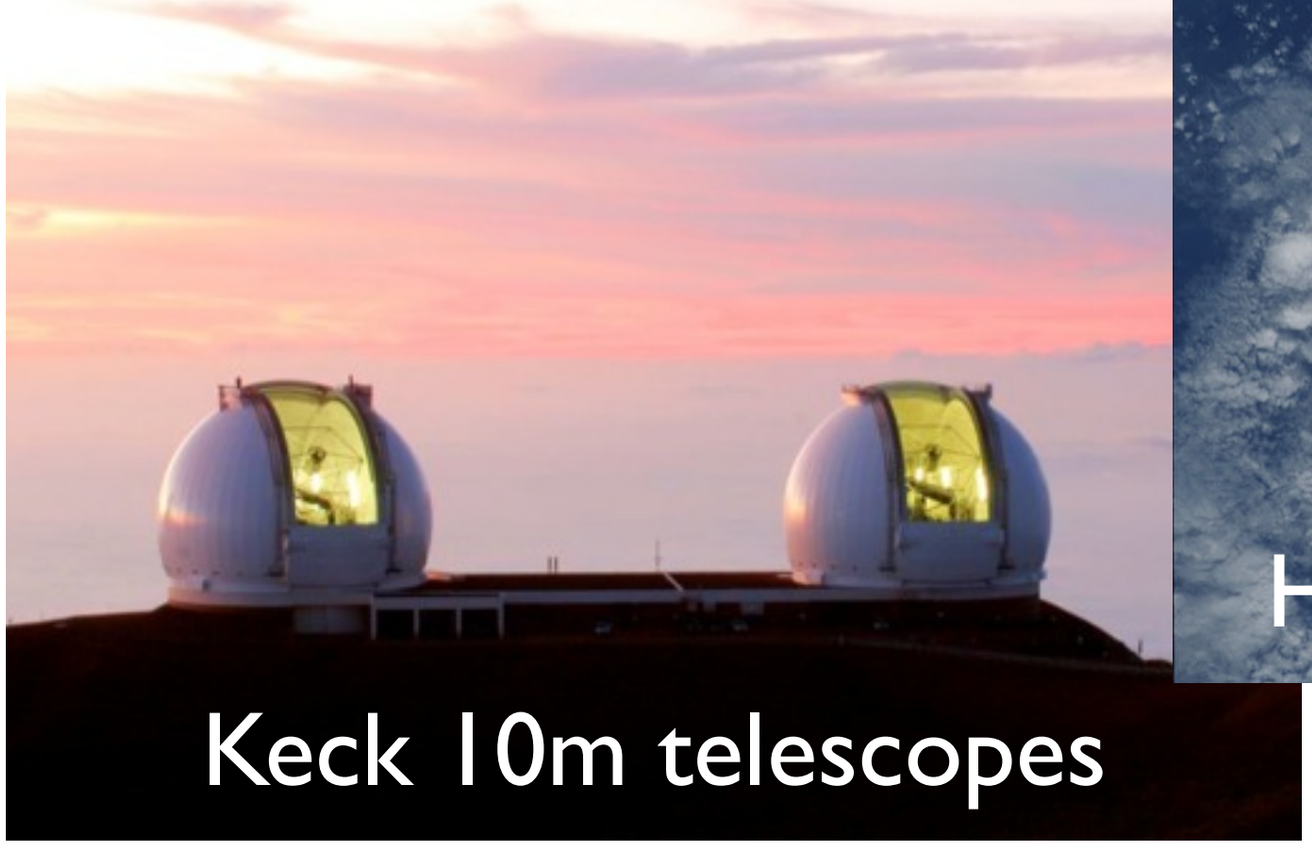




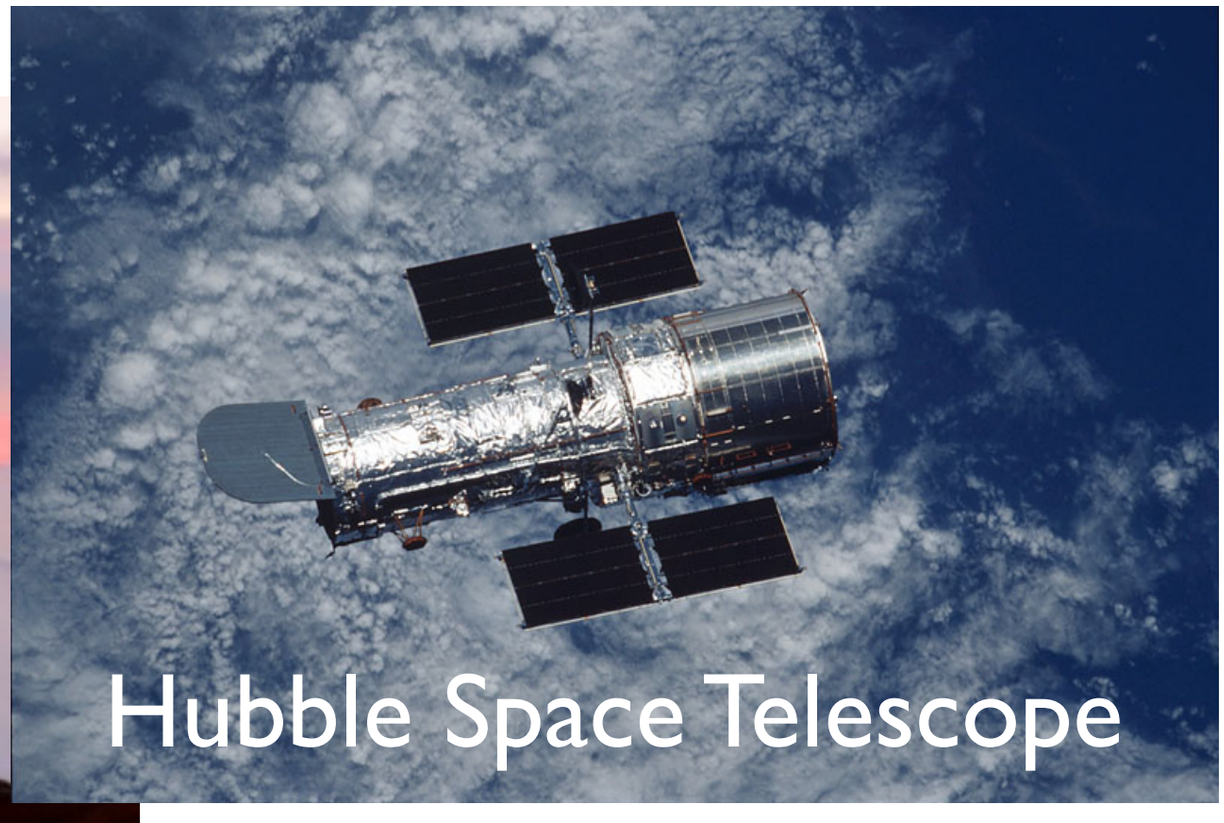


Course Objectives

- introduction to observational astronomy
- design, take, analyze and interpret astronomical observations
- same concepts as needed for these:



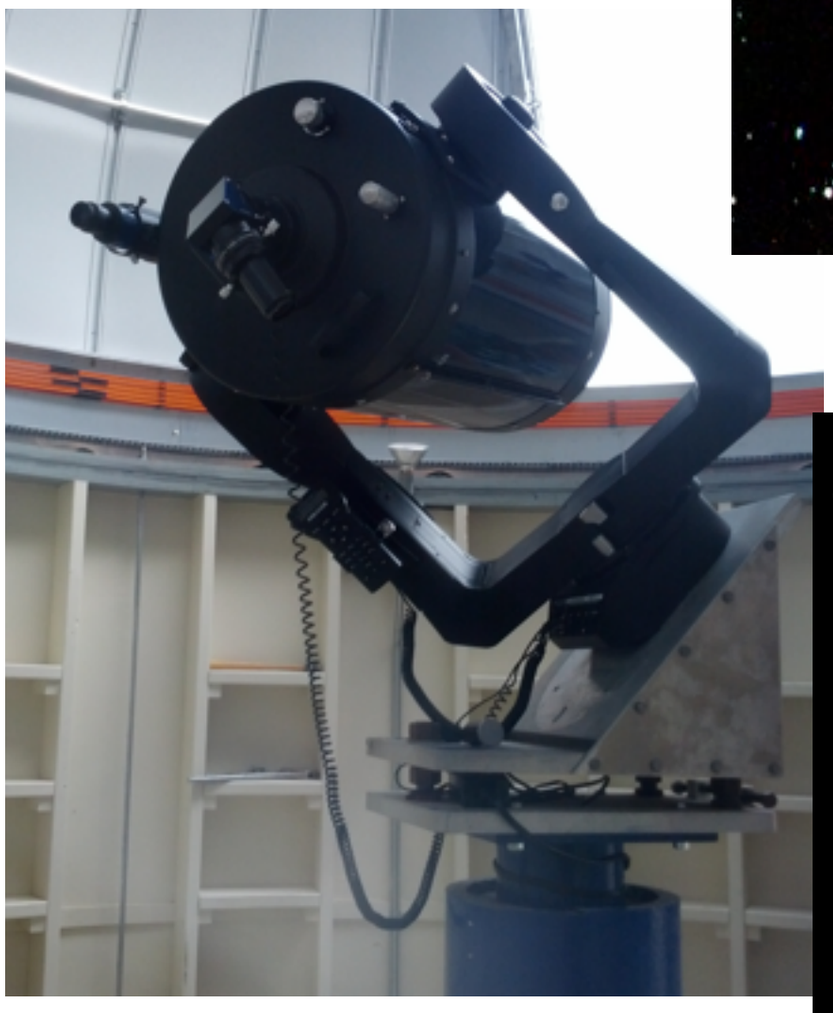
Keck 10m telescopes



Hubble Space Telescope

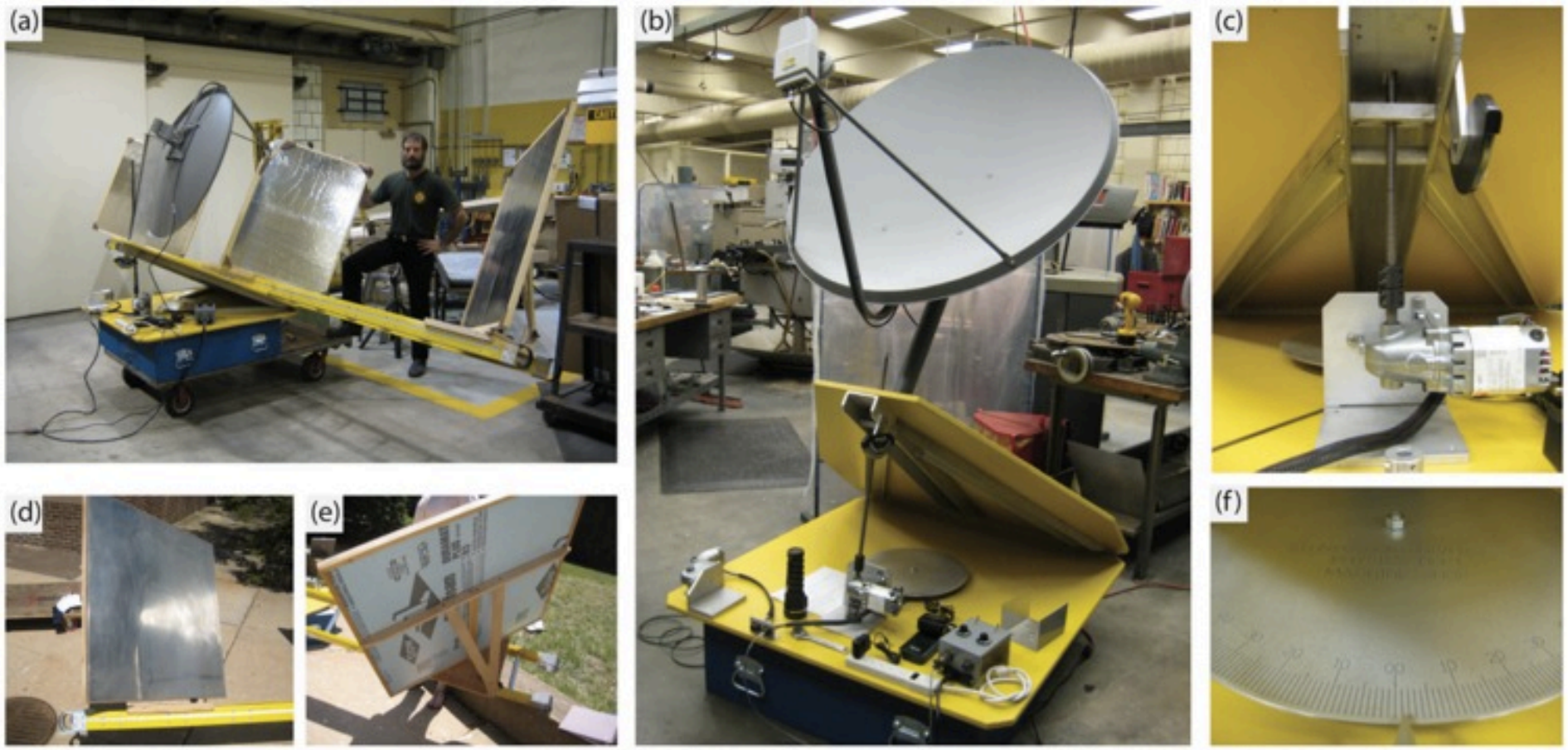
Mt Stony Brook Observatory

- roof-top dome + telescope (14-inch) + CCD camera + spectrograph



Radio interferometer

- custom-built at Stony Brook



A Michelson-type radio interferometer for university education

Jin Koda, James Barrett, Gene Shafto, Jeff Slechta, Tetsuo Hasegawa, Masahiko Hayashi, and Stanimir Metchev

Citation: American Journal of Physics **84**, 249 (2016); doi: 10.1119/1.4940212

How to be an astronomer

1. come up with an interesting idea / hypothesis
2. search for and analyze archival observations
3. write a telescope proposal
4. plan and execute your observations
5. analyze your data
6. write a journal paper
7. present your work at conferences

We'll deviate a bit ...

1. conduct and analyze observations
2. lab report → journal paper
3. write a telescope proposal
4. serve on a Time Allocation Committee (TAC)
5. present your work in class

Grading

~75% labs (3 labs, i.e. ~25% each)

~10% project proposal

~10% final presentation

~5% evaluation of peers' proposals and presentations

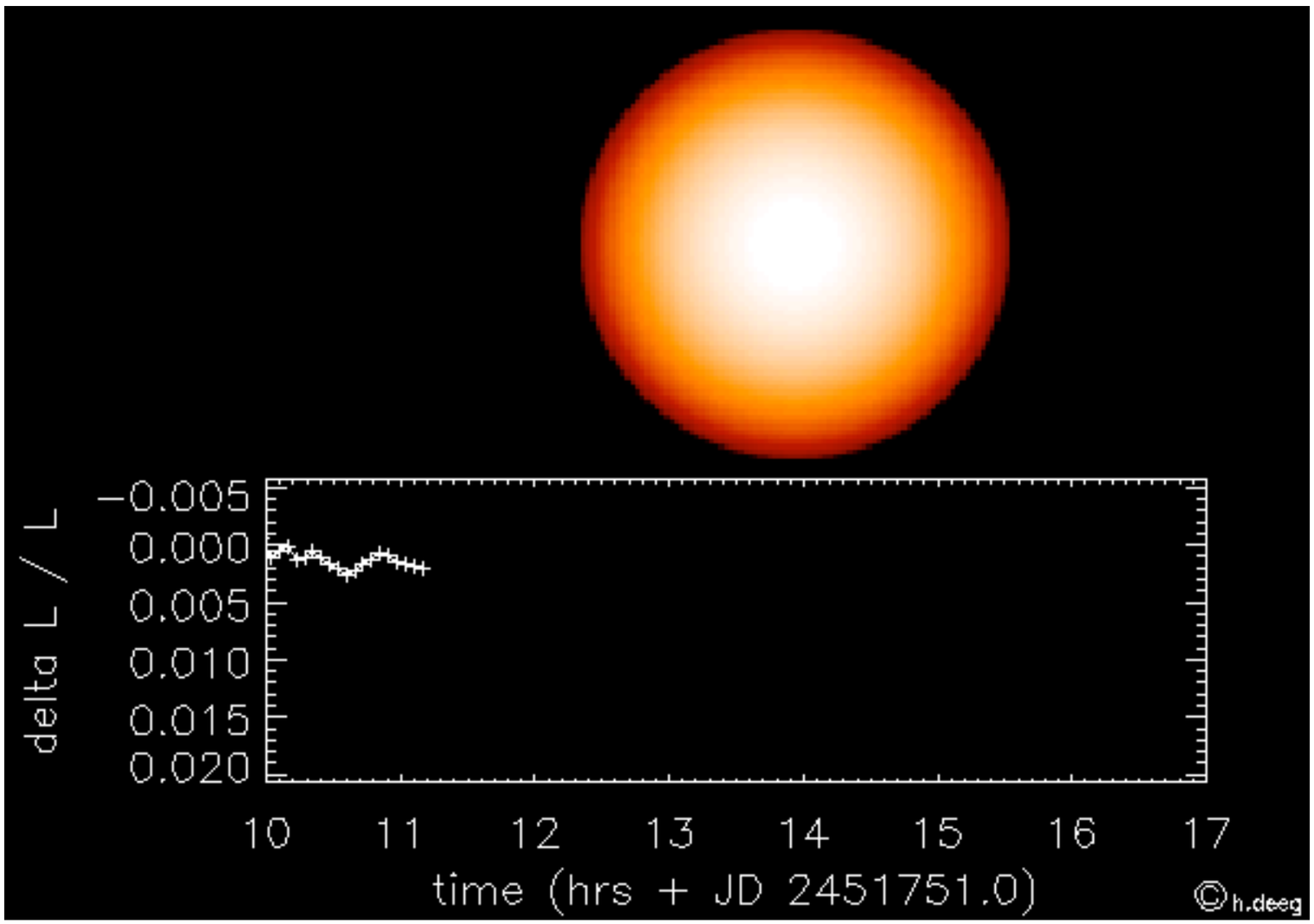
Course webpage

http://www.astro.sunysb.edu/anja/PHY517_AST443/

(might change to something more modern...)

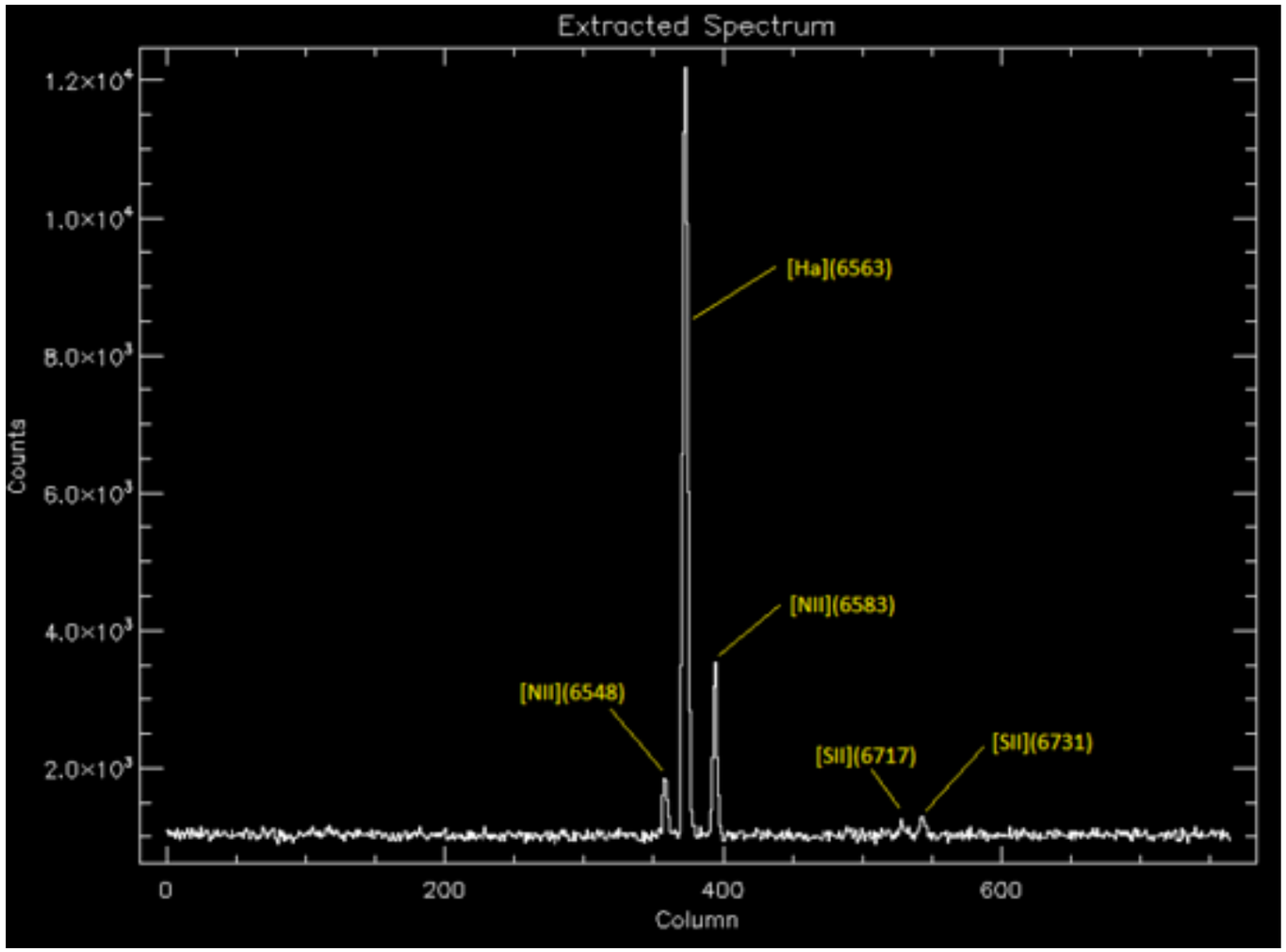
Lab 1 - optical imaging; time-series photometry

- detect an exoplanet transit



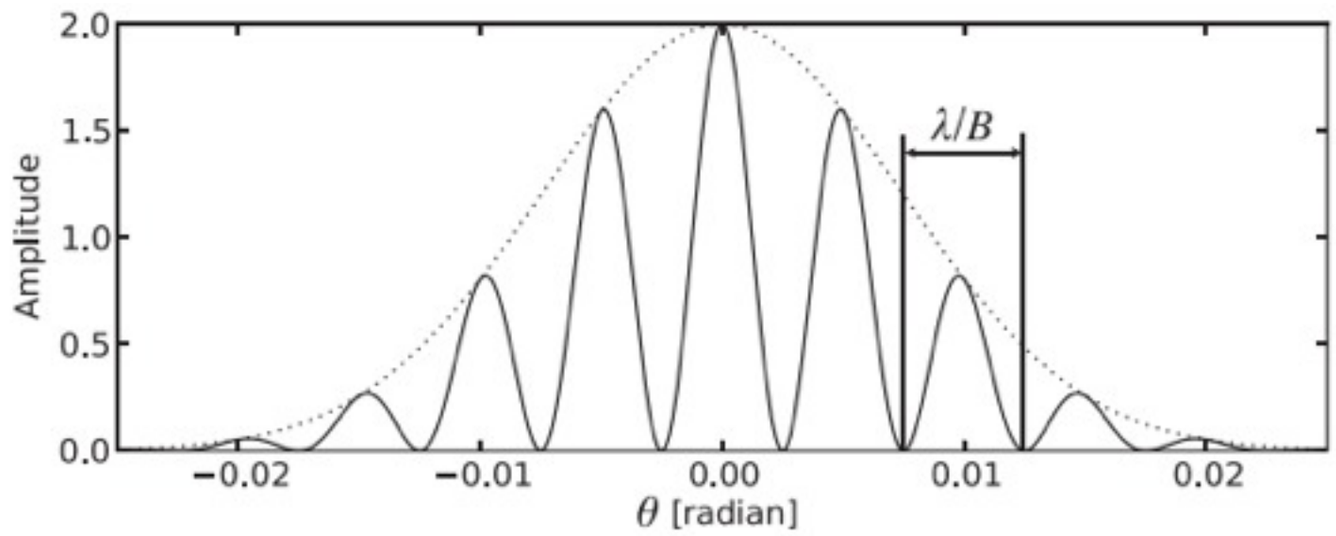
Lab 2 - optical spectroscopy

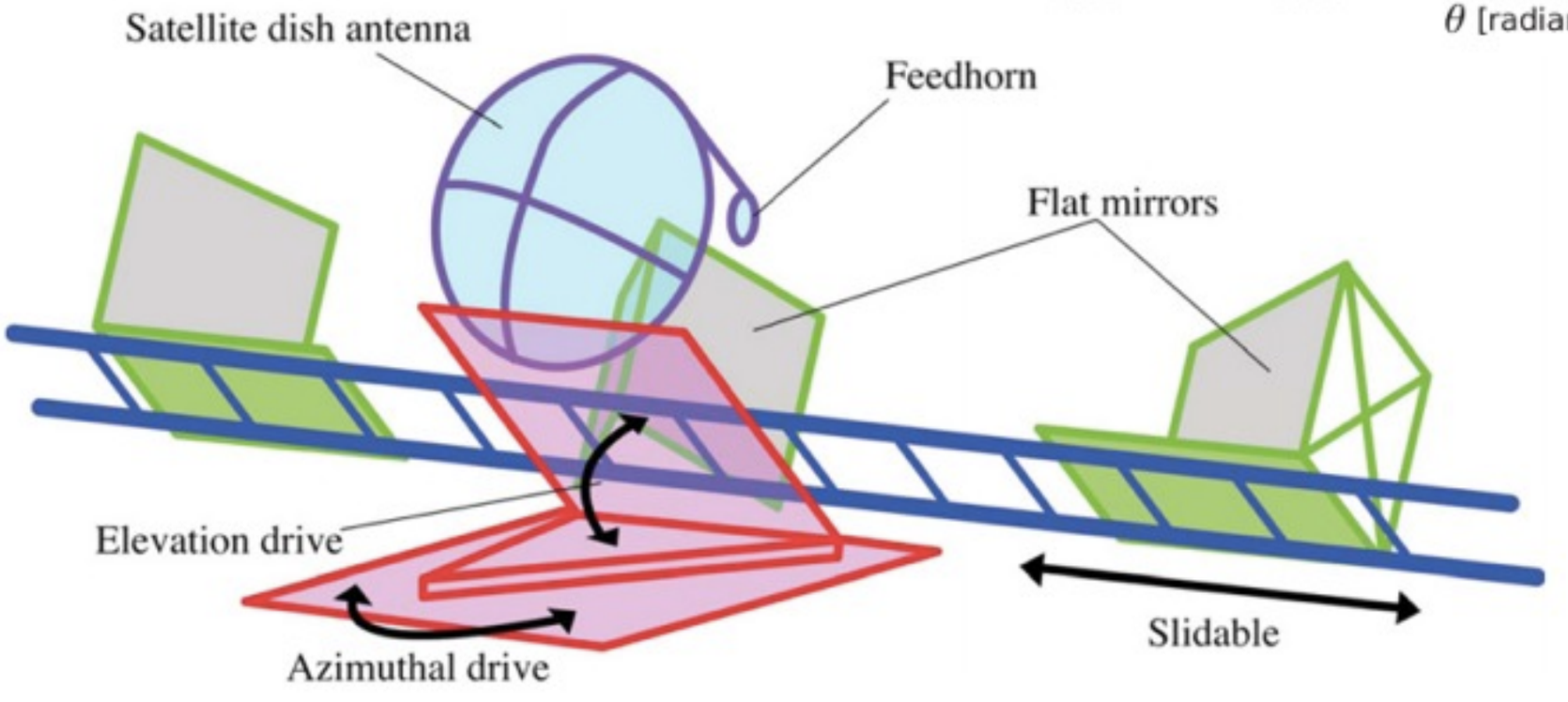
- measure the gas temperature of a gaseous nebula



Lab 3 - radio interferometry

- measure the diameter of the Sun





Class structure

Officially:

- Mon + Wed 6-9pm

In practice:

- 0-2 lectures per week
- most important scheduling constraint is that you get to take your observations
- you need good weather for all labs
- for each optical lab: schedule target night + 1-2 back-up nights
- radio lab: schedule target day + 1-2 back-up days
- as needed: Mon / Wed evening data reduction help

Team work

- observational astronomy is done in teams
- you will work in teams of 3
- please form teams of 3 people by Wed next week
- please make sure that
  - at least one of you has some programming experience
  - at least one of you has a laptop
  - you are available on the same week-nights / days

Night-time observing

- a TA or instructor must be present (or in the building)
- please plan your observations to be done by ~ midnight
- bring:
  - WARM clothes!
  - a red flash-light / rear bike-light
  - a USB key to take your data home
  - all materials needed for the lab: instructions, finding charts, your notebook etc.
  - cookies / chocolate

TAs

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This is me. Tell me who you are!