

**(Astro)Physics 343 Lecture # 10:  
lab 5 + deconvolution**

# Schedule

**This week: “observations” for lab # 5**

**All sections meet in my office (Serin 309W).**

**Next week: analysis for lab # 5.**

**April 20th: lab # 5 due. Guest lecture on gravitational lensing (from a radio viewpoint) by Ross Fadely, who will join us on Green Bank trip. I will be in Spain, so please send any questions about lab # 5 by noon on Saturday, April 18 if you want a guaranteed answer.**

**May 4: student choice lecture. One suggestion so far (HI rotation curves and modified Newtonian dynamics); others?**

# Introduction to Lab # 5

**This will be an introduction to interferometric data.**

**We do not have an interferometer on the roof! Therefore, you will be working with more archival data, in this case from**

**the IRAM**

**Plateau de Bure**

**Interferometer**

**(located in the**

**Alps outside**

**Grenoble, France).**

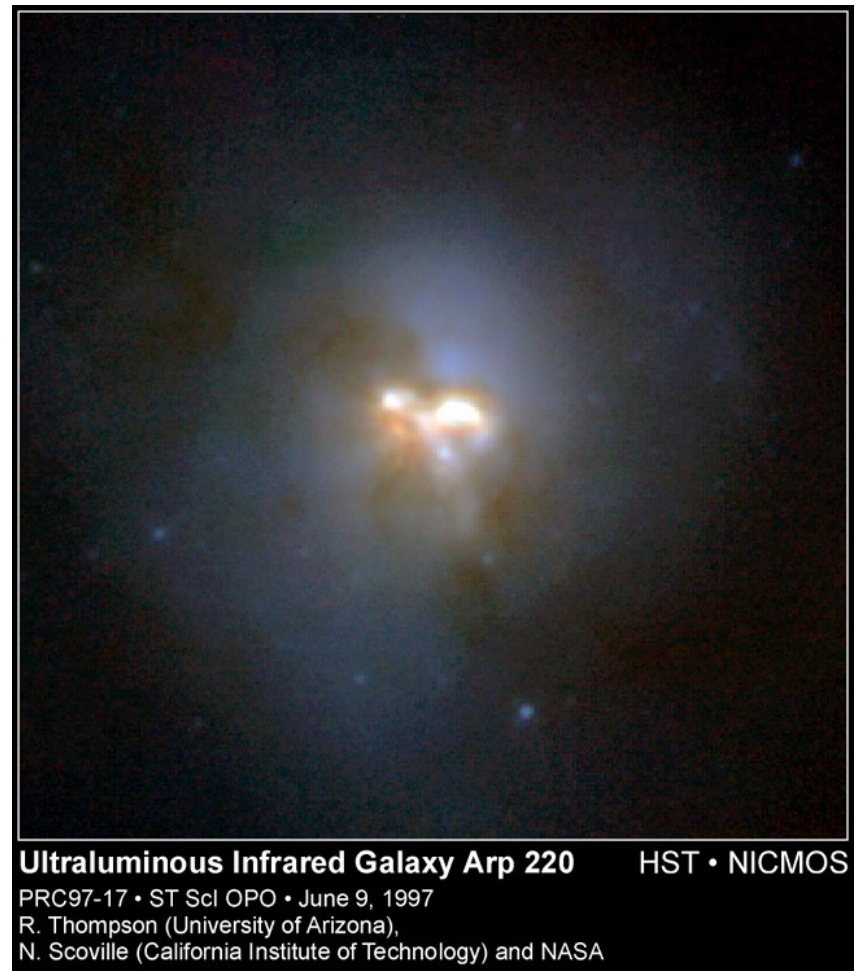


# Quiz

# Lab # 5: “observations”

These observations have been obtained in the CO( $J = 1 \rightarrow 0$ ) rotational transition, whose rest frequency is 115.271204 GHz.

The target is an ultraluminous infrared galaxy (ULIRG), in which the merger of two progenitor galaxies (e.g., at right) has triggered an intense starburst within the large gas mass that has coalesced at the system's center of mass.



# Lab # 5: data analysis

The data have already been calibrated (i.e., corrected for changes in the instrument response with time and frequency).

You will be taking the calibrated  $uv$  data (i.e., in the Fourier plane) at each frequency and making maps from them. This will require that you use the **Difmap** package for **deconvolution**.

Class handout = Difmap cookbook; useful websites =

<http://www.astro.caltech.edu/~tjp/citvlb/index.html>

[http://www.atnf.csiro.au/people/jlovell/difmap/www\\_help/](http://www.atnf.csiro.au/people/jlovell/difmap/www_help/)

# Lab # 5: access to data and software

**To access your data and the Difmap package, you will need to log into an account for your section on [yona.rutgers.edu](http://yona.rutgers.edu).**

**Account name = ph343{a,b,c,d,e}**

**Account password = constellation name + XXXX**

**For the initial lab, come to my office (Serin W309) during your lab section.**

**For the rest of the week, log on remotely as needed using, e.g.,**  
**ssh -X ph343a@yona.rutgers.edu.**

# Lab # 5: hints on Linux

The computer you will be using runs Linux, which makes heavy use of the command line:

- cd** changes current working directory
- cp** copies existing file to a new name or location
- ls** lists contents of current directory
- mkdir** creates a new directory
- mv** moves a file to a new name or location
- rm** removes a file
- rmdir** removes a directory



# Lab # 5: preparation for lab

**Before you come to lab this week:**

- (1) Read through the instructions for lab # 5 and be prepared to ask questions about anything that's not clear.**
- (2) Read sections 1-7 of the “Difmap cookbook” (skipping section 4.2, which is not relevant). You should focus on the main commands you will need to use for this lab:**  
**observe select device uvplot radplot vplot**  
**mapunit mapsize uvweight mapplot clean**

# Lab # 5: hints on Difmap devices

The trickiest part of using Difmap is (re)setting the output device.

(1) to screen:

“device 1/xs” or “device 2/xs”

(2) to hardcopy (an example that produces an output PS file):

“device output.ps/vcps”

[for **v**ertical, **c**olor]

“mapplot cln”

[creates the plot you want]

“device 1/xs”

[resets the device to screen!]