

The Big Bang and The Expansion of the Universe

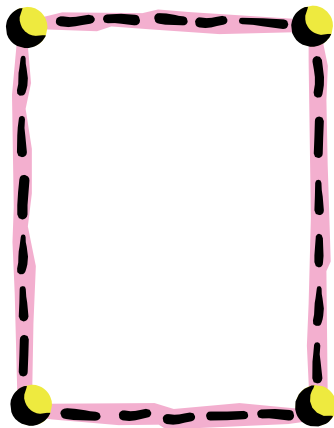
CLEA Exercise: The Hubble Redshift-Distance Relationship

The Do-At-Home-Version

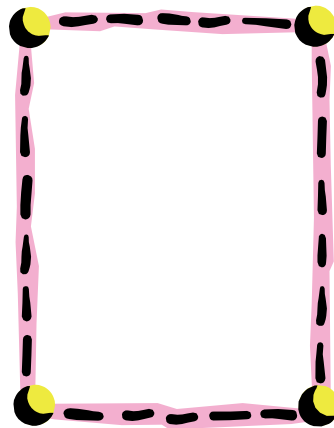
Note that doing this Lab at home will take LONGER since

- (a) You will not work together with other partners,
- (b) You have to figure out problems on your own,
- (c) You have to do all sections including the Extra Credit Options.

Do the Pre-Lab,
Hand in the Pre-Lab, the Main Lab, and the Lab Report
Instructions on back



The Universe – **BEFORE** the Big Bang



The Universe – **AFTER** the Big Bang

The computer program was written and designed by
Department of Physics
Gettysburg College
Gettysburg, PA 17325
Telephone: (717) 337-6028
email: clea@gettysburg.edu

The lab instructions are written and edited by
Esther L. Zirbel
Department of Engineering Science and Physics
College of Staten Island
Staten Island, NY 10314
Email: zirbel@postbox.csi.cuny.edu

Instructions

Basics:

The Hubble-Redshift Lab is a computer exercise.
You can use any computers and even do this exercise at home!
But you need the software to do the computer exercise.
Either get a CD with all CLEA programs from your instructor or follow the instructions below.
Do the PreLab and hand it in **together** with the main Lab!
Get a copy of the Hubble-Redshift lab-write-up and follow all the instructions.

Here is how to get the CLEA software:

Create a new subdirectory on you computer called “CLEA Programs”.
Go to the <http://www3.gettysburg.edu/~marschal/clea/hublab.html> website;
(Note you can also get there by going to <http://www3.gettysburg.edu/~marschal/clea/CLEAhome.html>
and then click on “Software” and follow this by
clicking on the “Photoelectric Photometry of Pleiades” icon.)
On the CLEA Hubble website click on “HubLab.exe”.
In the window that pops up, do not say “run”, instead click on “save”.
Save that file onto your computer into the “CLEA Programs” subdirectory.
To run the program double-click on “HubLab.exe”,
Finally follow the instructions in the Hubble-Lab-Write-Up.

Should you come across a problem, do the following:

Download and read the original “user’s manual”.
To do that, go to <http://www3.gettysburg.edu/~marschal/clea/hublab.html>,
Click on “User’s Guide” and the PDF file should show up in your browser window.
Click on “save a copy” in your browser and save the file into the CLEA programs subdirectory.
If the PDF file does not open in your browser you will need to download
the “Adobe Acrobat Reader” from <http://www.adobe.com/>.
Alternatively, if the link still works, you can also go directly to
http://www.adobe.com/products/acrobat/readstep2.html?ogn=EN_US-gntray_dl_get_reader,
and follow the instructions to install Adobe Acrobat Reader.

And now
Have Fun!!!