UCA Department of Physics and Astronomy

# PHYS 3345: OPTICS

# Basic Holography

# Spring 2008

## Where

The equipment will be available in room LSC 005. The kit will be on the table, and the solutions near the sink. In addition, everyone will be given two unexposed holographic plates.

## When

The equipment will be available from Monday, 04/07/08 through Friday, 04/18/08. You will need to be responsible for your own time management. The photographic process requires patience and careful attention to detail. Plan to spend about an hour setting up, checking for vibrations, getting everything in place, before you are ready to make an exposure. Please return the parts to the box when you have completed your work.

## What

You should use the manual provided as a guide for composing, exposing, and developing your hologram. You will have two unexposed holographic plates to work with. If your first attempt does not turn out well, you have a second plate and a second chance. If your first exposure is fantastic, then use your second plate to create a second hologram with a more sophisticated set up or complex subject. Be ready to expose two different subjects.

## Who

You are best served by working with a partner. This will be most efficient in terms of time and resources. Everyone is still responsible for creating their own plates, and for writing their own individual report.

## How

You will find the equipment manual fairly comprehensive. Please be sure to get everything (laser, subject, developing trays) set up before you turn off the lights. Most especially, ***do not expose your plates***! You will notice that you do not need *absolute* dark room conditions, but you do need a very dark room. The safelight is on the counter near the chemicals.

The developing solutions have been mixed for you, and the bottles are labeled clearly. Please use only 75ml of each A and B to mix the developer. Use 150ml each bleach and wetting solution, and use the labeled trays. There are several gallons of distilled water for rinsing. Do not rinse with tap water. Discard all solutions after use. Do not pour anything back into any bottle.

## Report

Format details are provided online. You have until 04/25/08 to submit a completed lab report. This is worth 100 points, so treat it accordingly. You should budget enough time to bring me a draft for comments before the final due date.

Because this report has no data or numerical error analysis, you will need to focus on the science of holography and the process of creating holograms. You will need to provide sufficient background and support for the science, so you will need documentation of sources.

You should also carefully and completely document your procedure. Construct a step-wise algorithm that, for example, could be understood and used by a UP physics student. Document the procedure with digital photographs (this is not optional, and it is in writing, so let there be no confusion over whether it has to be done or not. It does.). You should, of course, include an image of your final hologram. If you do not have access to a digital camera, the Physics Department has one. You will be permitted to use the camera as necessary.

The final version of your report should be printed in color, since you are including color photographs. The Physics Department has a high quality color printer, and the department secretary (Marcie Caldwell) will be very helpful. *Please* do not wait until the last minute, then inundate her with a dozen simultaneous and equally urgent requests. You may also send me a .pdf of your report, and I can print you a color copy.