

*Fine Arts Research
& Holographic Center*

HOLO I

School of Holography

LESSON VI

A BREAK!

SHOW MOVIES

SLIDES

PREPARE FOR

MBT

BACKGROUND
WHY HERE

WHAT ADVANTAGES & DISADVANTAGES
Hologram & IN GENERAL

QUESTIONS

ASTHETICS THINK SPACE

ONLY THINGS TO KNOW - NOT PHYSICS or MATH

RATIO
EXPOSURE
COHERENCE
CHEMICAL ACTION
VIEWING

NOT LENS DESIGN
IN CAMERA

BUT F STOP EXP. HOW FLASH WORKS
HOW LIGHT METER

HOW TO PROCEED FROM IDEA

HOLD I - JUST FOLLOW INSTRUCTIONS
GET PRACTICE
UNDERSTAND BASIC PRICIPLES
KEEP IT SIMPLE - WORKABLE

WHAT YOU LEARN HERE IS BASIC LIFE STRUCTURE - VISION -
POSSIBLY MEMORY ~~BEHAV~~

Name as many

- ① ~~What is the~~ difference between reflection hologram + transmission holograms (at least 3)
- ② What ^{are the parts of} makes lightward communication ~~better than~~ ^{that makes it} work?
- ③ Name 5 different uses of lasers.
- ④ What is light?

MIDTERM CETA TEST

~~BONUS what does LASER stand for?~~

~~OBJECTIVELY STATE WHAT YOU WANT OUT OF~~ _____



TOLD I LESSON VII

MULTIPLE BEAM TRANSMISSION
BEAMSPLITTERS

COHERENCE VOLUME - DISTANCES

BANDWIDTH

RATIOS - 1-3 STOPS (2:1 to 8:1)
REFERENCE TO OBJECT

I.M. NOISE

PROCESSING

HISTORICAL BACKGROUND

REVIEW QUIZ

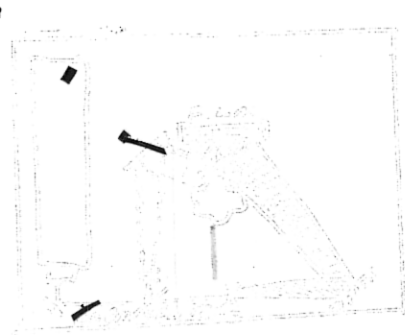
BRING DOWN A BEAMSPLITTER

HOLOI #7

STEPS FOR SETTING UP MULTIPLE BEAM HOLOGRAMS

- I PLACE COMPONENTS IN RELATIVE POSITIONS.
- II EQUALIZE BEAM PATH LENGTHS. (MEASURED FROM BEAM SPLITTER) *It is easiest to manipulate reference beam path*
- III SPREAD THE BEAMS.
- IV MEASURE THE INTENSITIES OF THE REFERENCE AND OBJECT BEAMS (WITH THE WHITE DIFFUSING CAP ON) TO FIND THE RATIO.
- V IF THE RATIO IS NOT IN THE PROPER RANGE, CHANGE IT BY ADJUSTING THE BEAM SPLITTER OR BY CHANGING THE SPREAD OF THE LENSES.
- VI ONCE THE RATIO IS SET, MAKE THE EXPOSURE READING (WITH THE WHITE DIFFUSING CAP OFF) AT THE FILM PLANE OF THE REFERENCE BEAM UNIT.
- VII MAKE THE EXPOSURE AND PROCESS.
- VIII RECONSTRUCT THE IMAGE BY REPLACING THE FILM IN THE HOLDER AND LETTING THE REFERENCE BEAM HIT IT FOR TRANSMISSION HOLOGRAMS OR VIEW THE REFLECTION HOLOGRAMS UNDER WHITE LIGHT.

TRANSMISSION



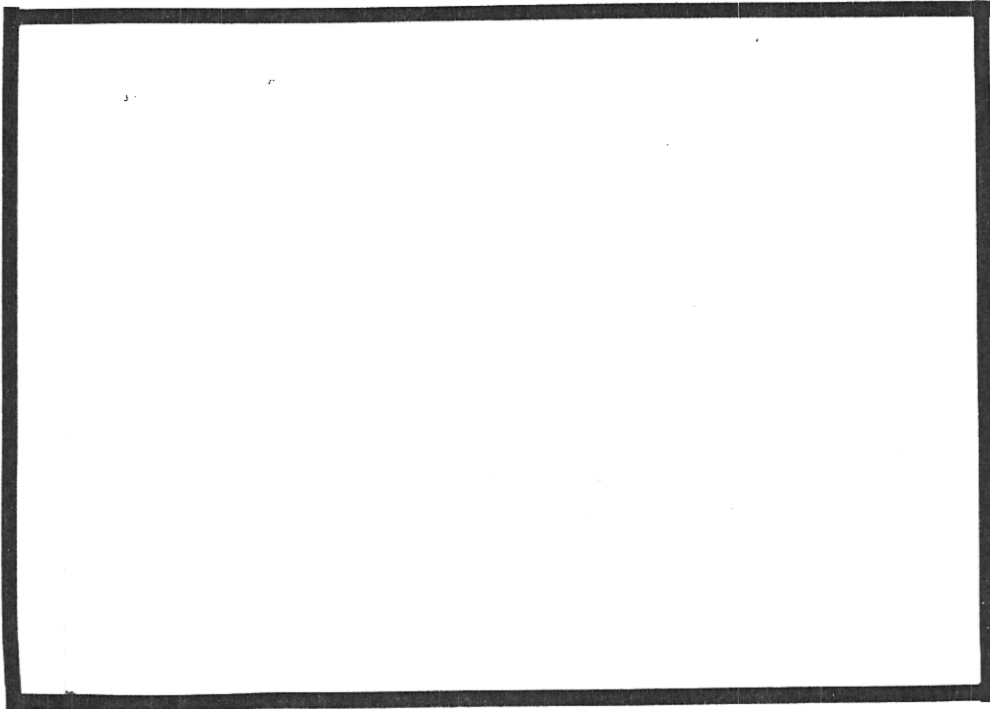
REFLECTION



BE CAREFUL TO CHECK RATIO FOR REFLECTION HOLOGRAMS IS WIDE RANGE FROM 0.1 THROUGH 3.0 OR MORE

IN REFERENCE TO OBJECT PATH FOR REFLECTION HOLOGRAMS MUST BE ONE TO ONE - INSTEAD OF PATH BEAMS MUST BE EQUAL.

MULTIPLE BEAM SET UP



NOTES

This set up allows complete control of the object's lighting. The object may be hit from the side, top, or from multiple sources. (If more than one object beam is used, all the object beam path lengths must be equal to the reference beam path length.) Master holograms for copy plates are made with multiple beam transmission set ups.

SET UP STEPS

- I. Place components in relative positions.
- II. Equalize beam path lengths, measured from the beamsplitter. It's easiest to manipulate the reference beam path to match the object beam path.
- III. Spread the beams.
- IV. Measure the intensities of the object beam and the reference beam with the white diffusing cap on, to find the ratio.*
- V. If the ratio is not in the proper range, change it by adjusting the beamsplitter or by changing the spread of the lenses.
- VI. Once the exposure is set, make the exposure reading (with the white diffusing cap off to the side of the light meter) at the film plane, of the reference beam only.
- VII. Make the exposure and process.
- VIII. Reconstruct the image by replacing the film in the holder and letting the reference beam hit it for transmission holograms, or view the reflection holograms under white light.

*Reference to object beam ratio for transmission holograms should be in the range of 2:1 to 16:1, while reflection holograms must be 1:1.

10/21/80
FW

HOLD I LESSON 8

MORE MULTIPLE BEAM
TRANSMISSIONS

FIELD QUESTIONS WARN ABOUT TEST

SHOW ADDITIONAL STUFF - 2 OBJECT
BEAMS, DIFFUSERS

REVIEW SETUPS + PROCESSING

LESSON IX

MBR. MOST DIFFICULT TO DO IN THIS CLASS.

WARN THEY MIGHT NOT COME OUT WELL.
STRESS STABILITY VERY MUCH

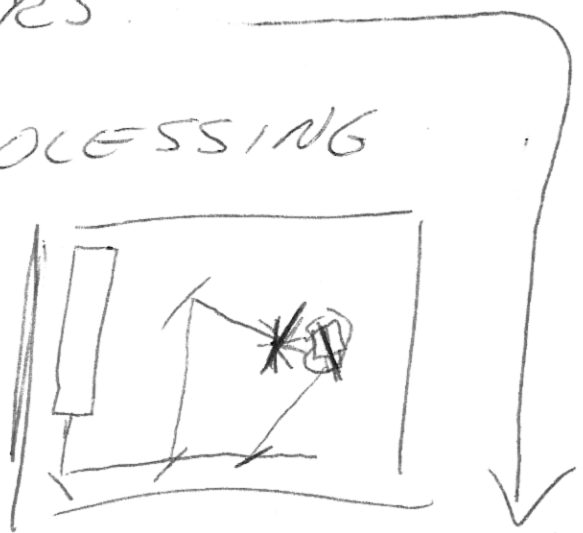
REVIEW DIFFERENCE IN FRINGE FORMATION

DRAW SET UP - USE PLANE GLASS BEAM SPLITTERS

REVIEW PROLESSING

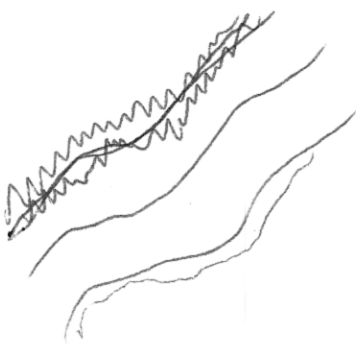
14 = 5"

TEST?



NOT TOO FAR BACK

1:1 ratio.
POSITION TO REFLECT DIRECTLY ONTO FILM



LESSON X
TURN 'EM LOOSE. HOLE I



ADMINISTER TEST (OR PASS IT
BACK)

LEAD THEM UPSTAIRS

DON'T FORGET TO PLUG HOLE II

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School of Holography HOLO I, LESSON X

CYLINDRICAL

KODAK PROCESSING

D-19, STOP, FIX, WASH, BLEACH,
WASH, PHOTO FLO

OR REVERSAL

D-19, STOP, BLEACH, WASH

HOW I TEST ADMINISTERED 9/2/80

EXPLAIN AS MANY DIFFERENCES AS YOU CAN BETWEEN REFLECTION AND TRANSMISSION HOLOGRAMS.

WHY IS A VIBRATION ^{FREE ISOLATION} TABLE NECESSARY FOR HOLOGRAPHY?

~~EXPLAIN~~ DESCRIBE WHAT HAPPENS IN EACH OF THESE PROCESSING STEPS

A - DEVELOPER

D - BLEACH

B - STOP C FIXER

E. PHOTO-FLO.

PROCESSING RECOMMENDATIONS FOR WHITE LIGHT REFLECTION HOLOGRAMS ON 8E75 HD

PROCESSING SEQUENCE:

- ① DEVELOP - 2 minutes @ 20°C IN GP62
- ② WASH - 1-2 MINUTES IN RUNNING WATER @ 20°C
- ③ BLEACH - UNTIL CLEAR @ 20°C IN GP432
- ④ WASH - 5 minutes IN RUNNING WATER
- ⑤ PHOTO-FLO - 200:1 DILUTION FOR 2 MINUTES
- ⑥ AIR DRY

GP 62 DEVELOPER

PART A

WATER 700 cc
METOL 15 g
PYROGALLOL 7 g
SODIUM SULFITE 20 g
POTASSIUM BROMIDE 4 g
SEQUESTRENE AGENT 2 g
WATER TO MAKE 1000 cc

PART B

WATER 700 cc
SODIUM CARBONATE 60 g
WATER TO MAKE 1000 cc

TO MAKE WORKING SOLUTION -
MIX 1 PART OF A PLUS 2
PARTS OF WATER AND 1 PART
OF B. READY TO USE LIFE

IS ONLY 1-2 HOURS. SEPARATE A AND B
SOLUTIONS ARE STABLE

GP 432 BLEACH BATH

WATER 700 cc
POTASSIUM BROMIDE 50 g
BORIC ACID 1.5 g
WATER TO MAKE 1000 cc

2 g per liter of
p-benzoquinone should
be added just before
use

RUBBER GLOVES
SHOULD BE USED WHEN
HANDLING BLEACH BATH.
THE LIFE OF THE
BLEACHING BATH IN THE
READY TO USE FORM IS
24 to 48 HOURS.

NAME _____

DATE _____

MEETING DAY _____

INTRODUCTORY HOLOGRAPHY (Test #1)

- 1) Describe three differences, in any stage of the process, between a transmission and a reflection hologram ?

- 2) Briefly define the following terms in reference to holography.
 - a) Diffraction:

 - b) Dispersion:

 - c) Reflection:

 - d) Refraction:

- 3) Why is vibration isolation so important to the holographic process ?

- 4) Why is the ratio between the reference and object beams of significance and what determines the proportion used in each individual case ?
- 5) Name the two properties that make a L.A.S.E.R. useful in holography and explain how they relate to the waves it produces ?
(use diagrams if you wish)
- 6) Briefly describe the purpose each of the following chemicals serve ?
- a) Developer:
 - b) Stop:
 - c) Fix:
 - d) Wash:
 - e) Bleach: