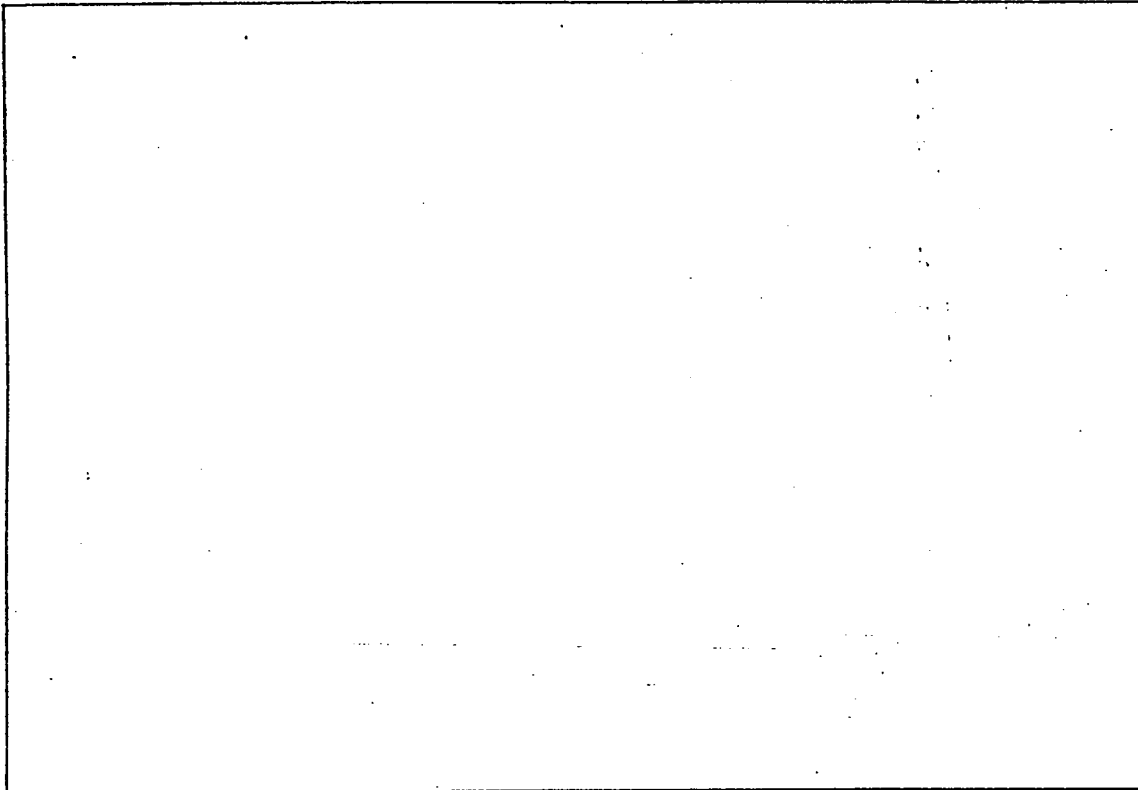


**SINGLE BEAM TRANSMISSION
HOLOGRAPHIC DIFFRACTION GRATING #1:
LOW FREQUENCY GRATING
For 8 by 10 inch or Smaller HOE's on the Beginning Table**



SKETCH THE SETUP IN THE BOX ABOVE.

PARTS LIST

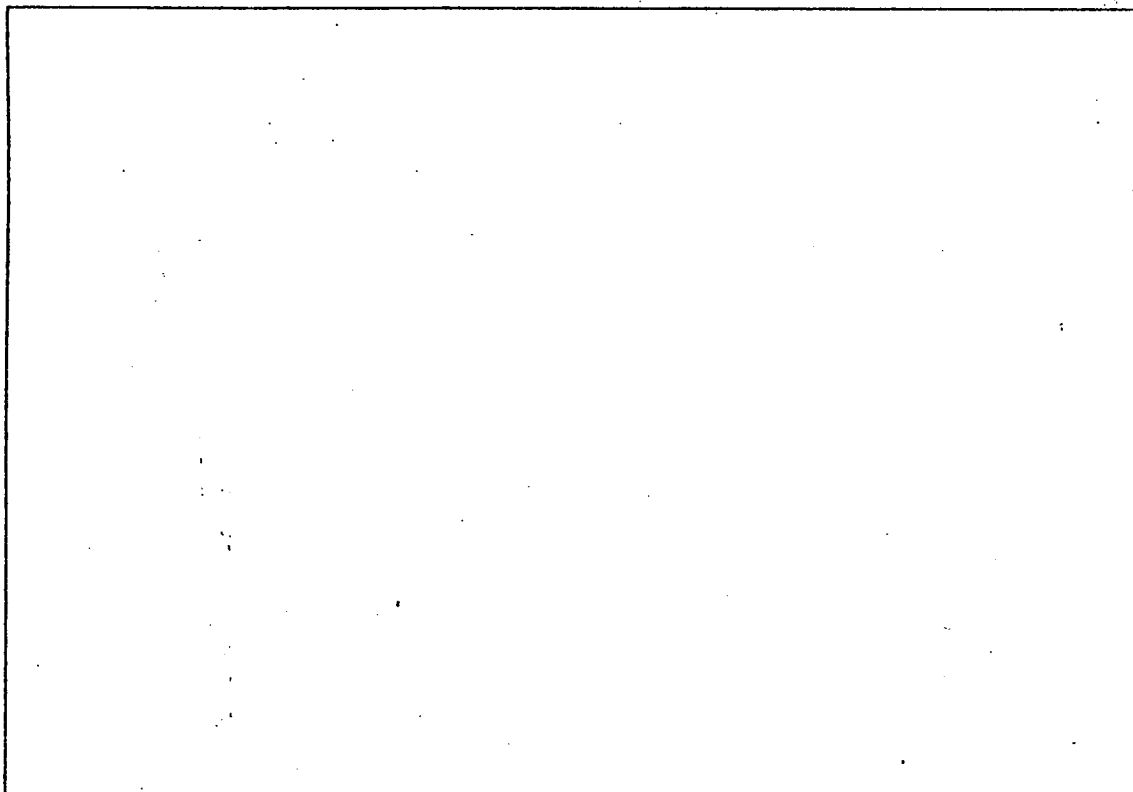
- | | |
|--|--|
| <ul style="list-style-type: none"> 1. LASER 2. SHUTTER 3. SPATIAL FILTER 4. 8 by 10" MIRROR in GOALPOST CONFIGURATION with TWO MAGNETIC BASES and RIGHT ANGLE CLAMPS 5. 10 by 12" MIRROR in GOALPOST CONFIGURATION with TWO MAGNETIC BASES and RIGHT ANGLE CLAMPS | <ul style="list-style-type: none"> 6. 4 by 5" PLATEHOLDER ASSEMBLY 7. LITTLE JOKER ASSEMBLIES (2) 9. HALF-WAVE PLATE ASSEMBLY 10. BAFFLES 11. GNOMON 12. PIECE OF GLASS 13. S & M LIGHT METER |
|--|--|

A pair of medium-sized mirrors in this set up each direct half of the divergent beam to the Holographic Plate. The intra-beam angle for this interference field is very small, about ten degrees, and generates fringes of low spatial frequency, sometimes big enough to see! This type of grating works great in conjunction with point sources, neon tubes, fluorescent lamps, LED's, or as an image multiplier.

SET UP STEPS

1. This setup is an add-on to the basic **SINGLE BEAM TRANSMISSION WITH MIRROR MASTER HOLOGRAM** layout. Refer to steps 1 through 4 of the **HANDOUT, "Single Beam Transmission with Mirror Master Setup"** to send a diverging beam zig-zagging across the table if the equipment is still not on the **TABLE**.
2. Cover the **SECOND LARGE CORNER**, ((5) in the above-mentioned Handout), with its black wood cover. Place the two **LITTLE JOKER ASSEMBLIES** in front of it, with their edges butting each other.
3. At the opposite end of the table, position the **HOLOGRAPHIC PLATEHOLDER (6)** so that its center is at the juncture of the two **LITTLE JOKERS**.
4. With the **TARGET CARD** in the **PLATEHOLDER**, move one of the **LITTLE JOKER MIRROR ASSEMBLIES** so that its reflected light is incident on the **PLATEHOLDER**. Manipulate the other **LITTLE JOKER** so that its reflection also lights up the **TARGET CARD**.
5. If the beam is spread wide enough, the **PLATE** should be evenly illuminated from side to side.
6. Place a **PIECE OF GLASS** in the **PLATEHOLDER** and make sure that the light of each **LITTLE JOKER'S MIRRORS** reflects off the **GLASS** back towards the other one. This makes an Unslanted Grating, which has its fringes oriented perpendicular to the **HOLOGRAPHIC FILM BASE**, which is not so biased to any particular direction of light.
7. Align the **Polarization Vector of the Laser** for minimum reflectivity (maximum penetration) according to the directions given in the handout, **"ALIGNING POLARIZATION VECTORS"** if necessary.
8. Measure the intensity of both beams, singly and together, with the **S & M LIGHT METER** aiming for as close to a 1 to 1 **BEAM BALANCE RATIO** as possible, and plan your exposure according to their combined total.
9. Expose and process. **CAUTION!** This is one of the few times when it is mandatory to use the **'Chrome, Silver Solvent, Reversal, or Yellow Bleach** in processing the **HOE**. (See the **Handout, CWC2**.) Also use exposure number 250 instead of 450 when calculating the exposure time.
10. Look through the grating at a variety of light sources to amuse and amaze yourself.

**SINGLE BEAM TRANSMISSION
HOLOGRAPHIC DIFFRACTION GRATING #2:
90 DEGREE DISPERSING GRATING
For 8 by 10 inch or Smaller HOE's on the Beginning Table**



SKETCH THE SETUP IN THE BOX ABOVE.

PARTS LIST

- | | | | |
|----|-----------------------------|-----|--------------------------|
| 1. | LASER | | |
| 2. | SHUTTER | | with TWO MAGNETIC BASES |
| 3. | SPATIAL FILTER | | and RIGHT ANGLE CLAMPS |
| 4. | 8 by 10" MIRROR in GOALPOST | 6. | 4 by 5" PLATEHOLDER |
| | CONFIGURATION with TWO | | ASSEMBLY |
| | MAGNETIC BASES and RIGHT | 7. | LITTLE JOKER ASSEMBLY |
| | ANGLE CLAMPS | 9. | HALF-WAVE PLATE ASSEMBLY |
| 5. | 10 by 12" MIRROR in | 10. | BAFFLES |
| | GOALPOST CONFIGURATION | 12. | GNOMON |
| | | 13. | S & M LIGHT METER |

A large mirror in this set up directs half of the divergent beam to the Holographic Plate while the other half is directly incident. The intra-beam angle for this interference field is 90 degrees for maximum dispersion. This type of grating works great in conjunction with a slide projector.

SET UP STEPS

1. This setup is an add-on to the basic **SINGLE BEAM TRANSMISSION WITH MIRROR MASTER HOLOGRAM** layout. Refer to steps 1 through 4 of the **HANDOUT, "Single Beam Transmission with Mirror Master Setup"** to send a diverging beam zig-zagging across the table if the equipment is still not on the **TABLE**.
2. After the **SECOND LARGE CORNER**, ((5) in the above-mentioned Handout), at the end of the table opposite to it, position the **HOLOGRAPHIC PLATEHOLDER (6)** so that one of its edges is at the center of the spread circle.
3. Verify that the spread beam is incident upon the **HOLOGRAPHIC PLATEHOLDER** at 45 degrees from the normal using the **HOLOGRAPHIC ANGLE FINDING TARGET CARD (GNOMON)**.
4. With the **TARGET CARD** still in the **PLATEHOLDER**, move one of the **LITTLE JOKER MIRROR ASSEMBLIES** up to the **PLATEHOLDER** so that one of its edges butts up against the **HOLOGRAPHIC PLATE** and that it directs the spread beam so that it too, is incident upon the **TARGET CARD** at 45 degrees. The **PLATEHOLDER** and **MIRROR** should then be perpendicular to each other.
5. If the beam is spread wide enough, the **PLATE** should be evenly illuminated from side to side.
6. Align the **Polarization Vector of the Laser** for minimum reflectivity (maximum penetration) according to the directions given in the handout, **"ALIGNING POLARIZATION VECTORS"** if necessary.
7. Measure the intensity of both beams, singly and together, with the **S & M LIGHT METER** aiming for as close to a 1 to 1 **BEAM BALANCE RATIO** as possible, and plan your exposure according to their combined total.
8. Expose and process. Place the freshly-made **GRATING** in the path of a **SLIDE PROJECTOR** and tilt it at 45 degrees to the light. A rainbow should be diffracted at right angles out of the **HOE**. Also try the trick with a point source.