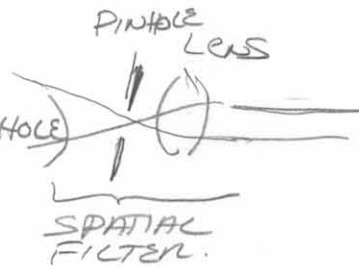


F.I.P. ALIGNMENT

SPRINGS 1993

- SET UP LASER ~~TO~~ TRACK.
- BRING ALL ELMTS TO LASER & ROUGHLY ALIGNED.
- LASER / PRISM ONLY.
CENTER ON 1ST PRISM FACE.

- INSERT SPATIAL FILTER.
ALIGN SO BEAM EXITS
CENTER BLOB. ON PRISM (NO ANTHOLE)

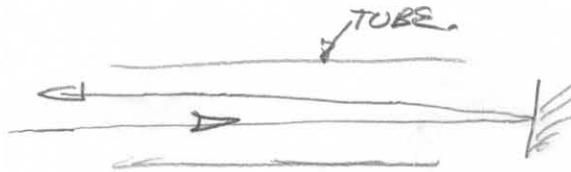


POT AN HOLE IN / FOCUS

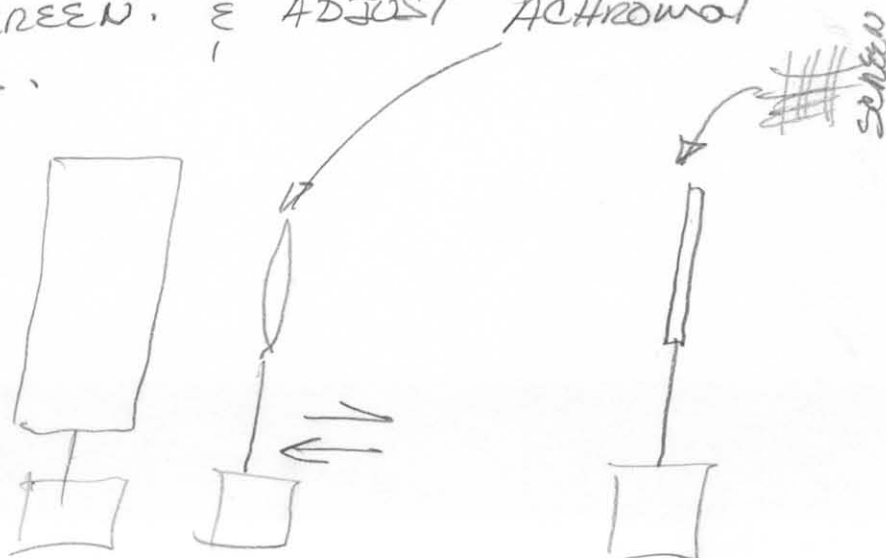
- IMAGE PIN HOLE ON 1ST PRISM HORIZ. SURF
(FOCUS)



- ADJUST BEAM TO HIT MIRROR CENTER

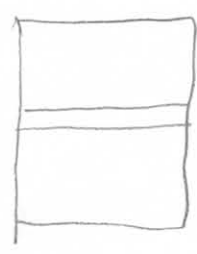


- INSERT SCREEN. & ADJUST ACHROMAT
FOR FOCUS.

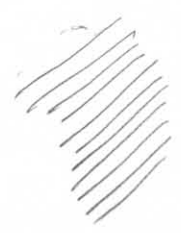
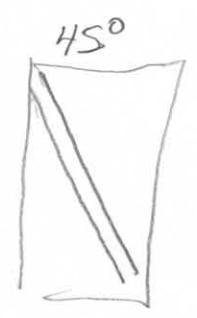


WIDER IMAGE \Rightarrow SMALLER WIRE MESH SPACING.

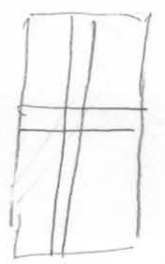
(BIG \rightarrow SMALL)
(SMALL \rightarrow BIG)



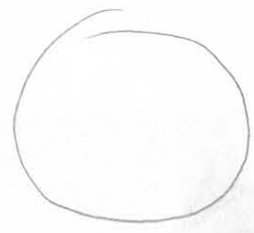
HORIZ. LINES \rightarrow



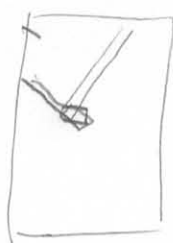
LINES @ 90°
TO SLIT.
SPACING $\frac{\sqrt{2}}{2}$ smaller.
than reg. screen.
DOTS FARTHER
APART \rightarrow



CENTRAL
DOT +
SURROUNDING
AREA



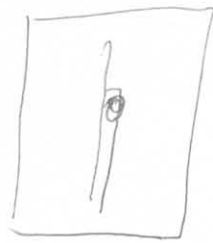
BLOB
(ALL INFORMATION
GONE)



CLOSE
DOWN
CENTRAL
DOT



BLOB.
DIRT BLURS
↳ MANY FREQUENCIES.



DIRT

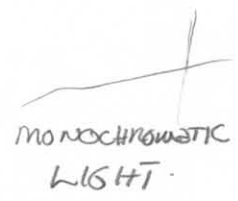


DIRT.

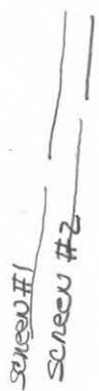
BLOCK OUT
CENTRAL DOT
OF
TRANSFORM
ONLY.



COMPLEMENTARY
OBSTACLE.



BABINET'S PRINCIPLE:



#4
(ONLY)
BRIGHT
A. EQUALLY
BRIGHT
(#2 ONLY)

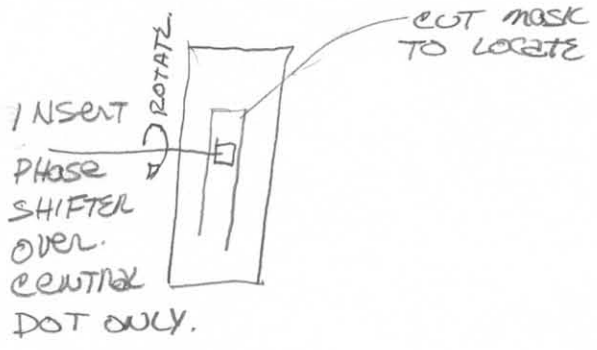
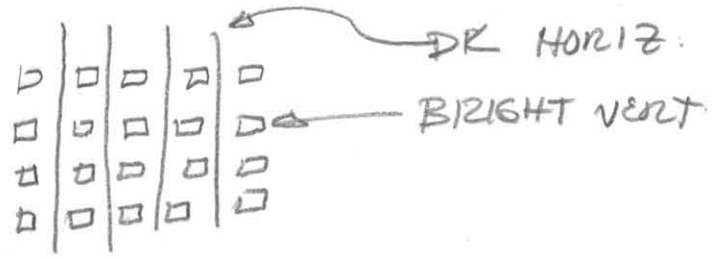
EQUAL & OPPOSITE (CANCEL)

CAN ONLY APPLY BABINET'S PRINCIPLE
TO DARK WIRES.



BABINET'S
PRINCIPLE

ALL WIRES BRIGHT (LIGHT THRU WHERE
LIKE LOCITE.) WIRES WERE
PREVIOUSLY DARK.)
(MUST HAVE INITIALLY DARK
W/O OBSTACLE WITH
OBSTACLE → LIGHT)



BRIGHT → DK
DK → BRIGHT } AS ROTATE GLASS PHASE-SHIFTER CHIP.

CANT APPLY BABINET'S PRINCIPLE.

ENERGY OF WHOLE PATTERN IS CONSERVED

CONSERV. ENERGY (WRT OPTICS) → TRICKY TO APPLY.

BLK ⇒ WHITE. (⇒ ENERGY NOT CONSERVED.)
@ 1ST GLANCE

CONSTRUCTIVE & DESTRUCTIVE RELATED, { YOUNG'S 2-SLIT EXP.
(AMPLITUDE)² = (INTENSITY)²

Phase shifter ⇒ SAME TOTAL ENERGY.

3) - MOVE SCREEN TOWARD LASER.

⇒ PATTERN SPACING GETS LARGER.
(SET-UP Z-ROWS)
LOCK DOWN.

- ROTATE SCREEN.

① { DOTS SPREAD IN 1-DIRECTION ONLY. (HORIZONTALLY)

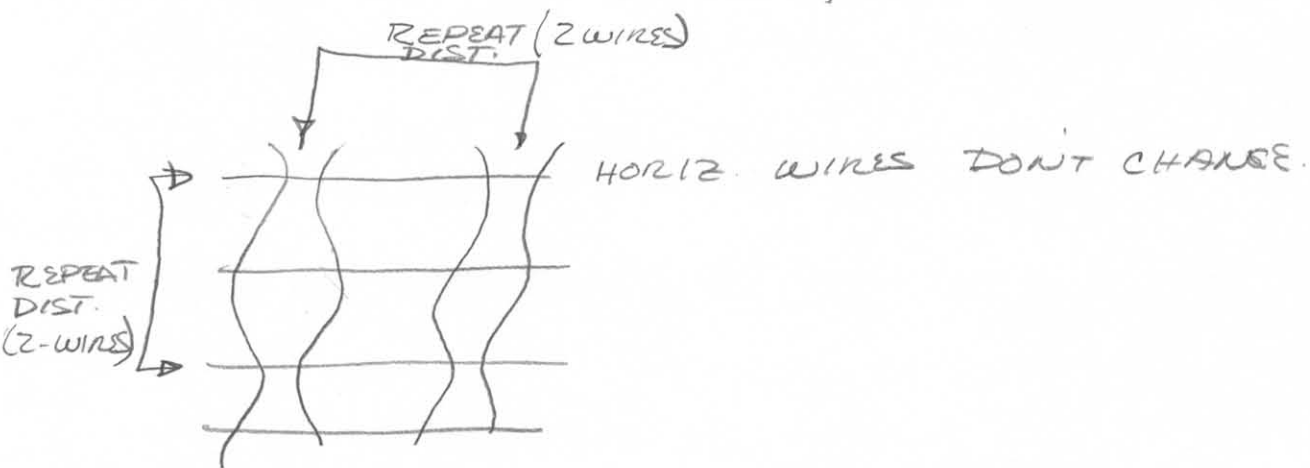
FUND. FREQ. REPRESENTS AS. WIRE SPACING.

② { DOTS APPEAR.

1, 2, 3, 4 (SPACING) = HARMONICS

$\frac{\text{SPACING}}{2}, \dots$

{ CELL = EVERY 2ND WIRE }
{ INTERWEAVING. - OBSERVED }
{ WHEN TURNED @ 2 }



⑥ MOVE SCREEN CLOSE TO PRISM ASSEMBLY
DISFUSER ON

OBSERVE HIGH ORDERS (50-60)

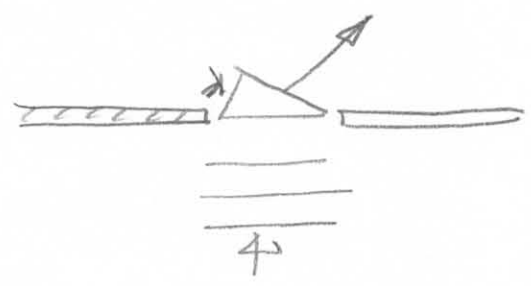
- ① APPEARANCE OF CROSS.
- ② CROSS HAS DARK BANDS.

NOTE SIMILARITY TO RONCHI RINGS.

SUCCESSIVE MINIMA CREATE DARK BANDS.

(ASYMMETRY IN WEAR
 ⇒ ROTATE WIRE MESH 90°)

SINGLE SLIT.
 FIRST NULL @ $n\lambda$ ($n=1,2,\dots$)



- PUT SCREEN NEAR LASER LEAS

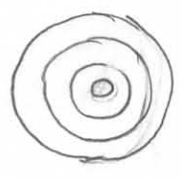
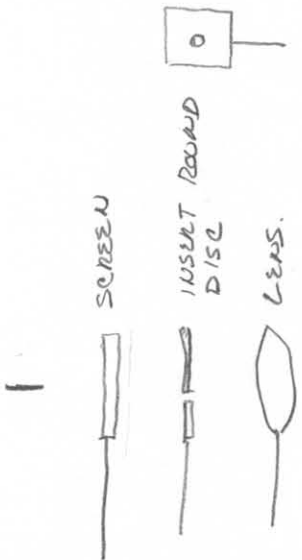
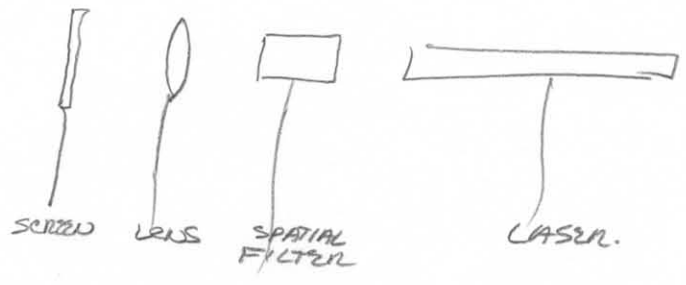
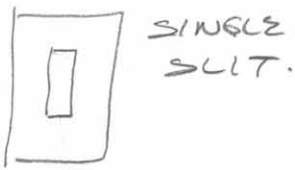
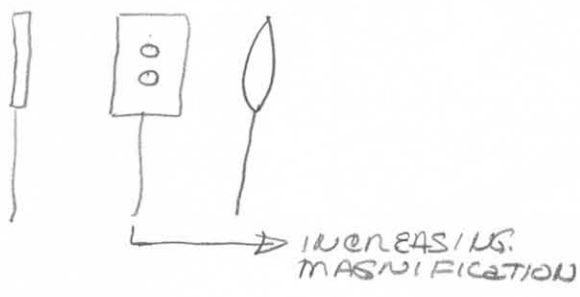


IMAGE OF ROUND OPENING.
 BESSEL FCTN.
 OR AIRY FCTN.
 WHITE = RED
 BLK = BLK.

CHANGE IN PHASE.
 STRAIGHT LINE FRINGES

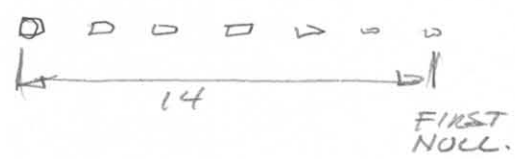
YOUNG'S 2-SLIT PATTERN

SERIES LINES
 EQUALLY BRIGHT
 EQUALLY CURVED.
 PATTERN SAME.



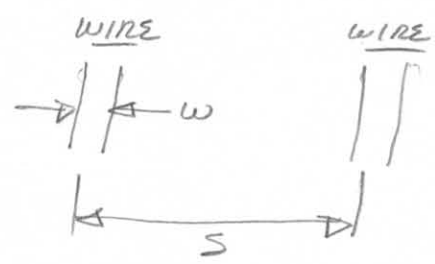
THIN WIRES \Rightarrow

(1 ROW BRIGHT DOTS)
 (VERY BRIGHT) CENTER SPOT
 (REGULAR SPACING) WIDER.
 (SHARP \Rightarrow REPEATS BOTH WAYS)



$$\frac{\lambda}{w} = 14 \frac{\lambda}{s}$$

$$\frac{s}{w} = 14$$



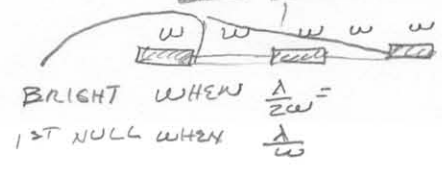
SPACING DISTANCE.

FRAUNHOFER DIFFRACTION

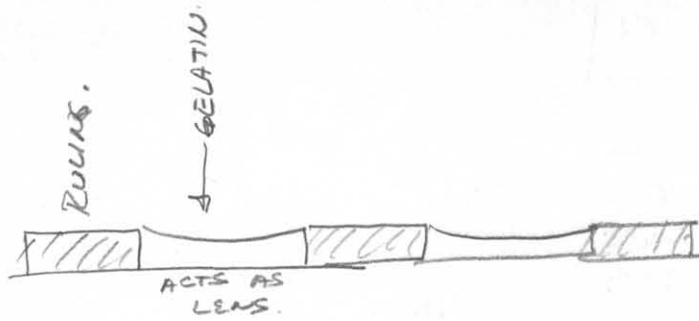
RHONCHI RULING.
 (DIP = LIGHT SPACINGS)

DOT PATTERN

NULL WHEN

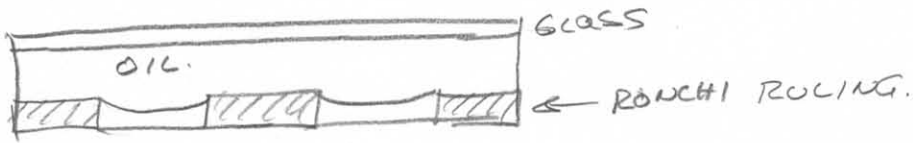


BRIGHT WHEN $\frac{\lambda}{2w} =$
 1st NULL WHEN $\frac{\lambda}{w}$



RONCHI RULINGS.
W/O GELATIN.

PHASE SCREW-UP W/ GELATIN.



Δ INDEX REFRACTION W/ OIL ADDED \Rightarrow
NO PATTERN DISTORTION AS IN
ABOVE EXAMPLE.

POISSON BRIGHT SPOT

