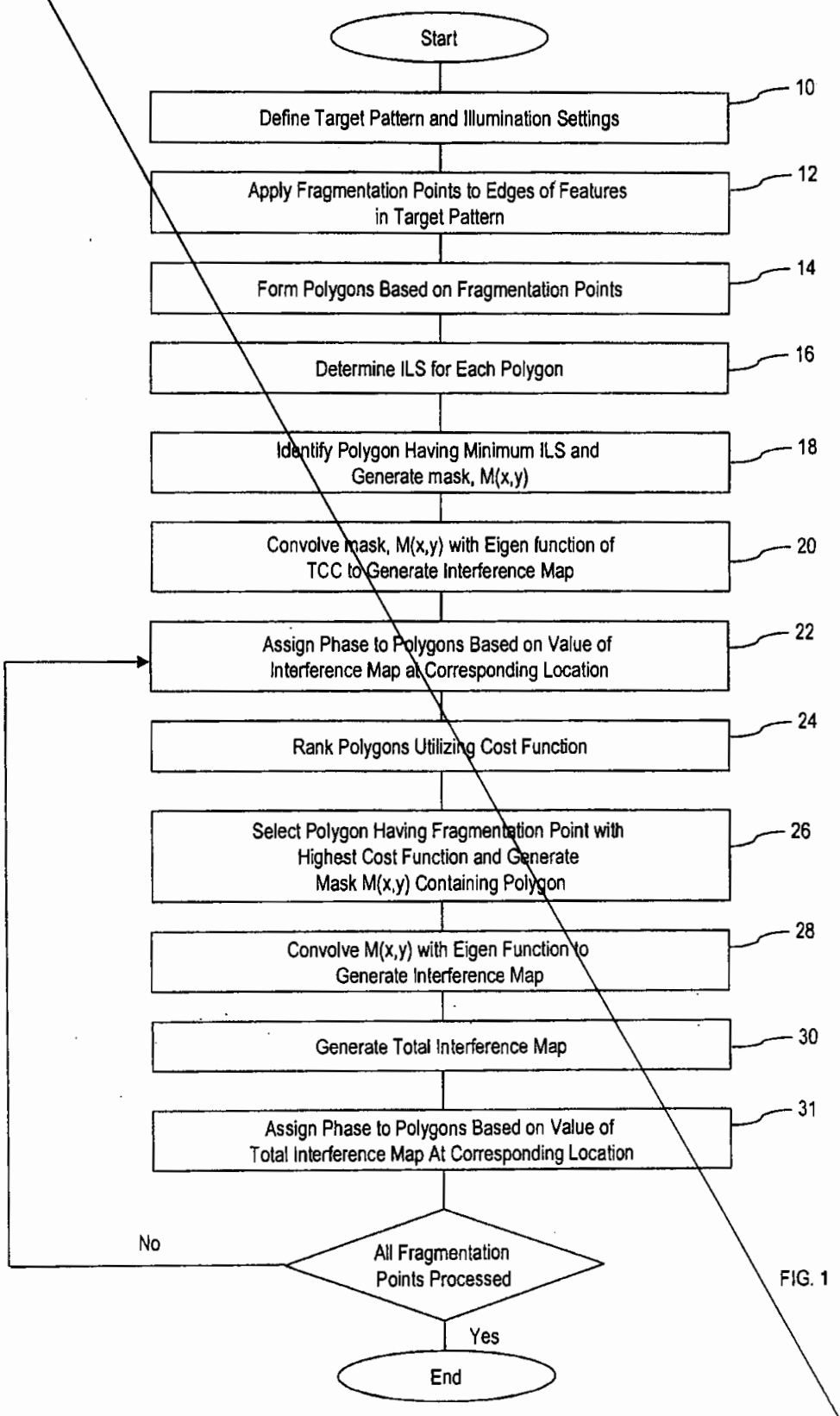
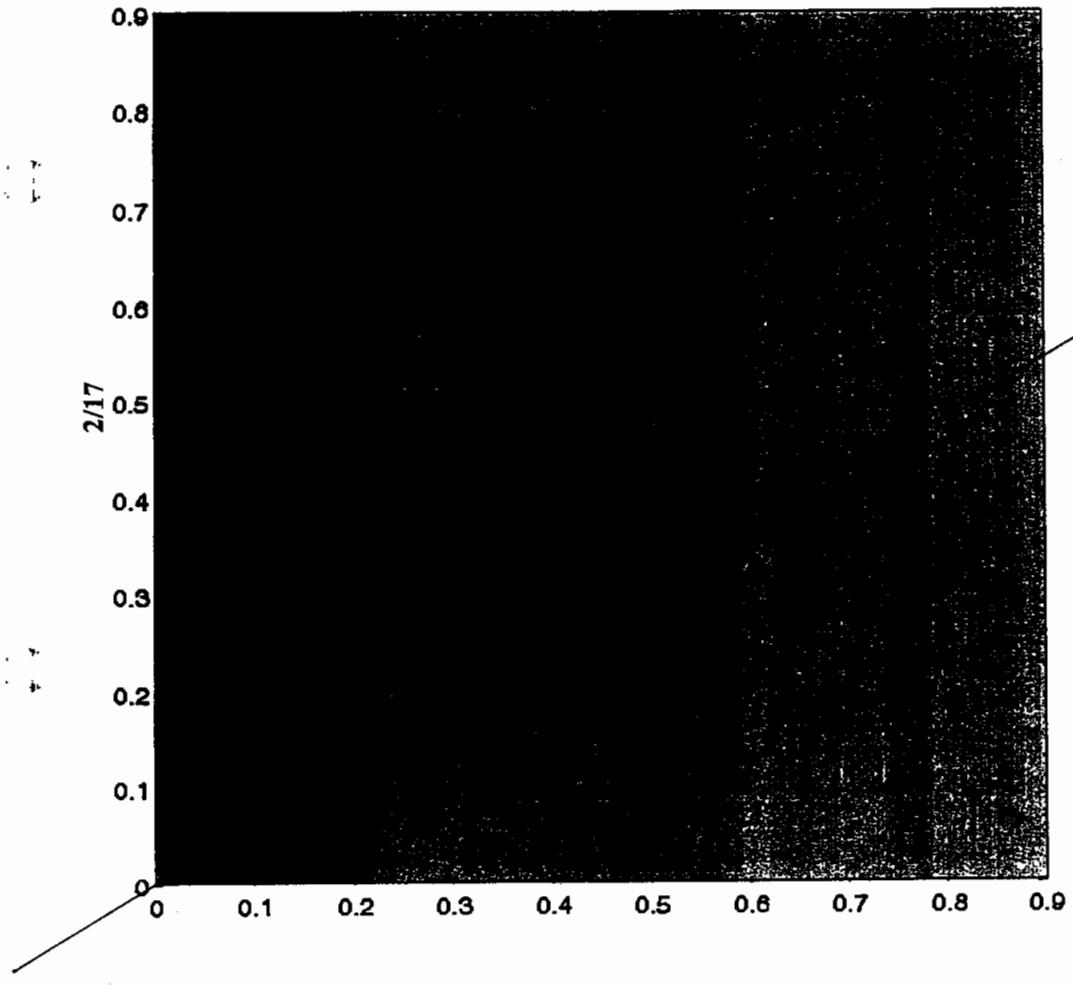

Start
Define Target Pattern and Illumination Settings
10
Apply Fragmentation Points to Edges of Features in Target Pattern
12
Form Polygons Based on Fragmentation Points
14
Determine ILS for Each Polygon
16
Identify Polygon Having Minimum ILS and Generate mask, M(x,y)
18
Convolve mask, M(x,y) with Eigen function of TCC to Generate Interference Map
20
Assign Phase to Polygons Based on Value of Interference Map at Corresponding Location
22
Rank Polygons Utilizing Cost Function
24
Select Polygon Having Fragmentation Point with Highest Cost Function and Generate Mask M(x,y) Containing Polygon
26
Convolve M(x,y) with Eigen Function to Generate Interference Map
28
Generate Total Interference Map
30
Assign Phase to Polygons Based on Value of Total Interference Map At Corresponding Location
31
All Fragmentation Points Processed
No
Yes
End

FIG. 1

Mask pattern to be split



Min. half pitch=32.2nm
k_1=0.2
NA=1.2
λ=193nm

Annular illumination to be used
σ_{in}=0.77 σ_{out}=0.97

FIG. 2

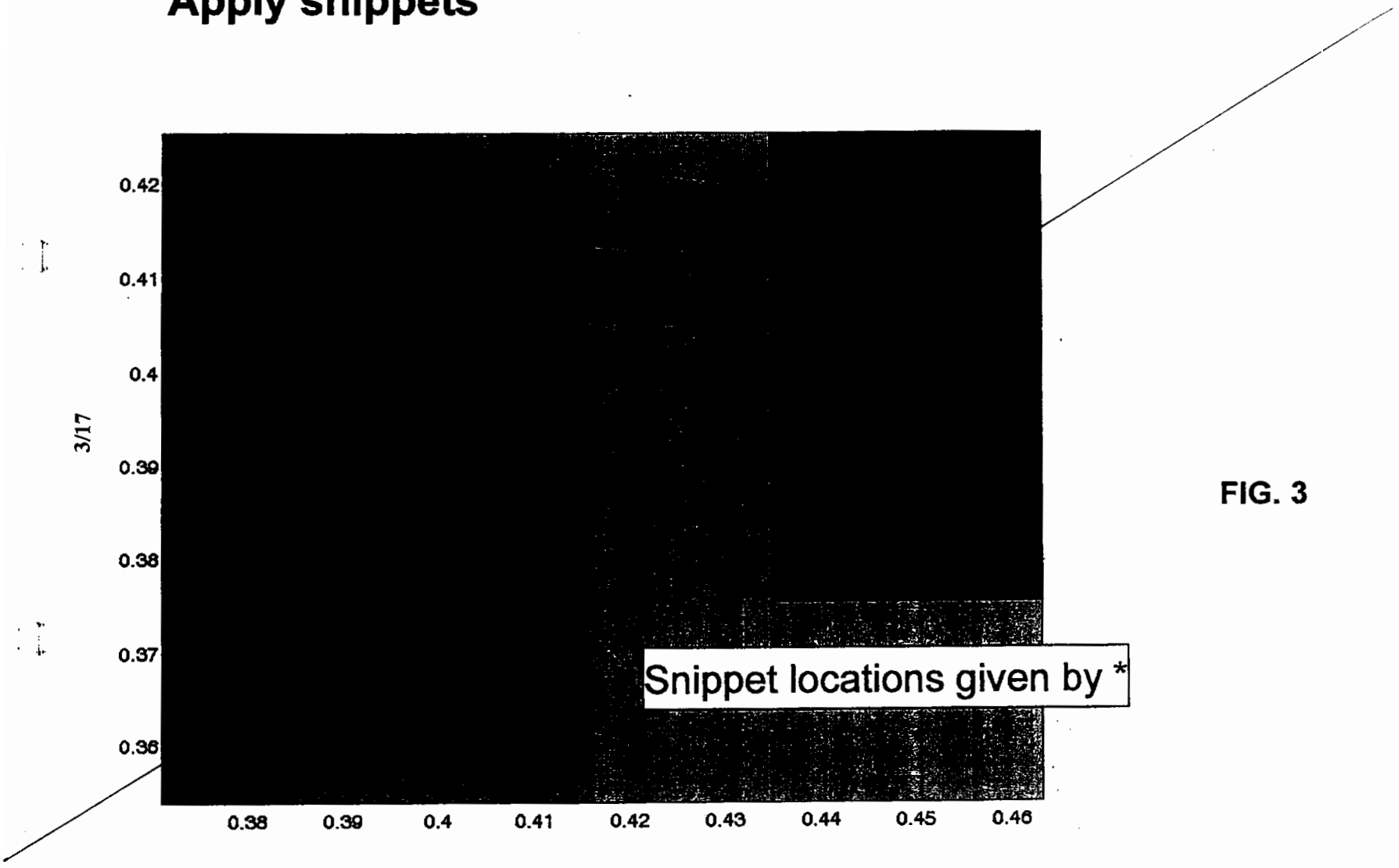

Apply snippets
0.42
0.41
0.4
0.39
0.38
0.37
0.36
0.38
0.39
0.4
0.41
0.42
0.43
0.44
0.45
0.46
Snippet locations given by *

FIG. 3

Create Polygons from the snippets

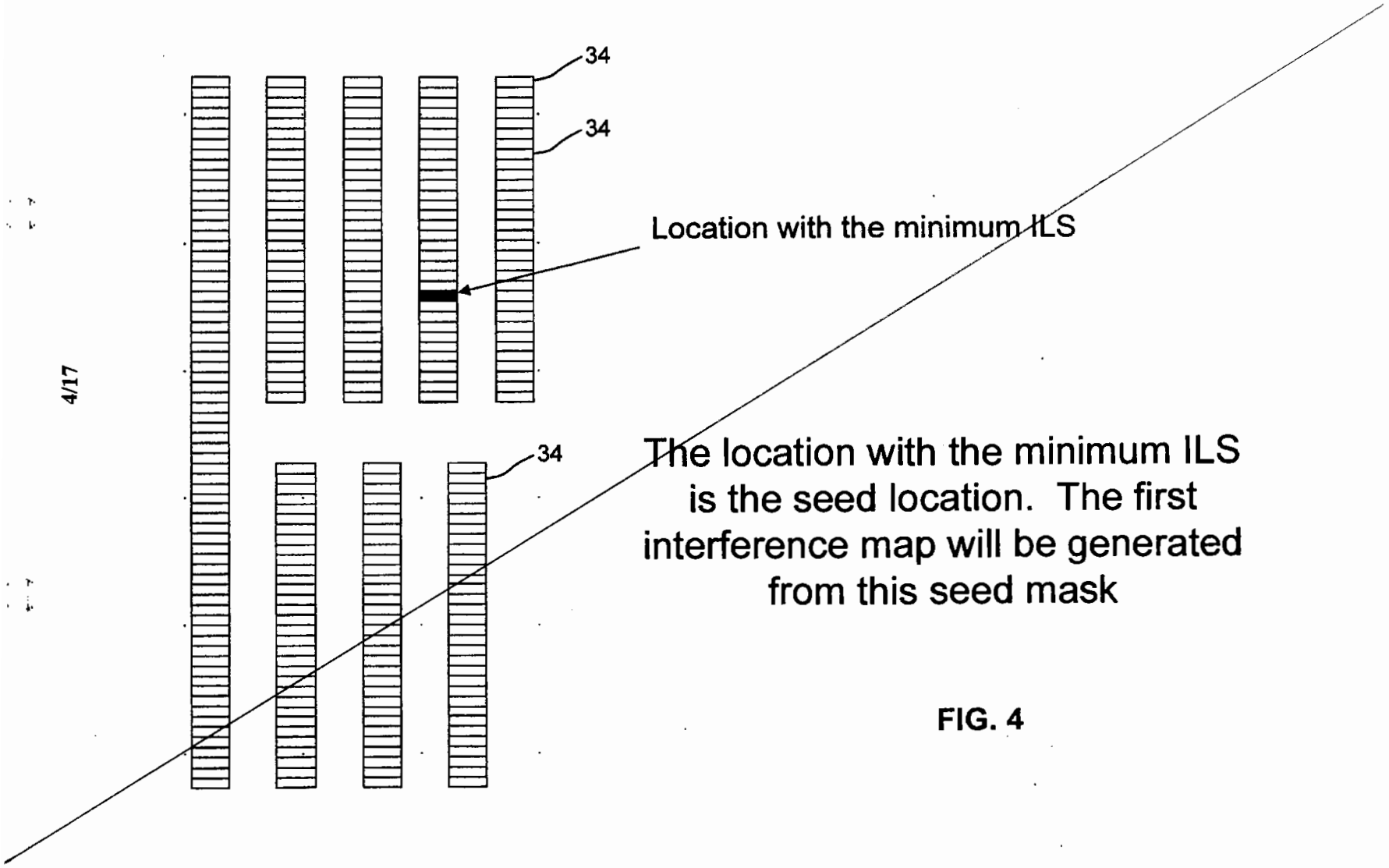


FIG. 4

Create a mask with the polygon with lowest ILS

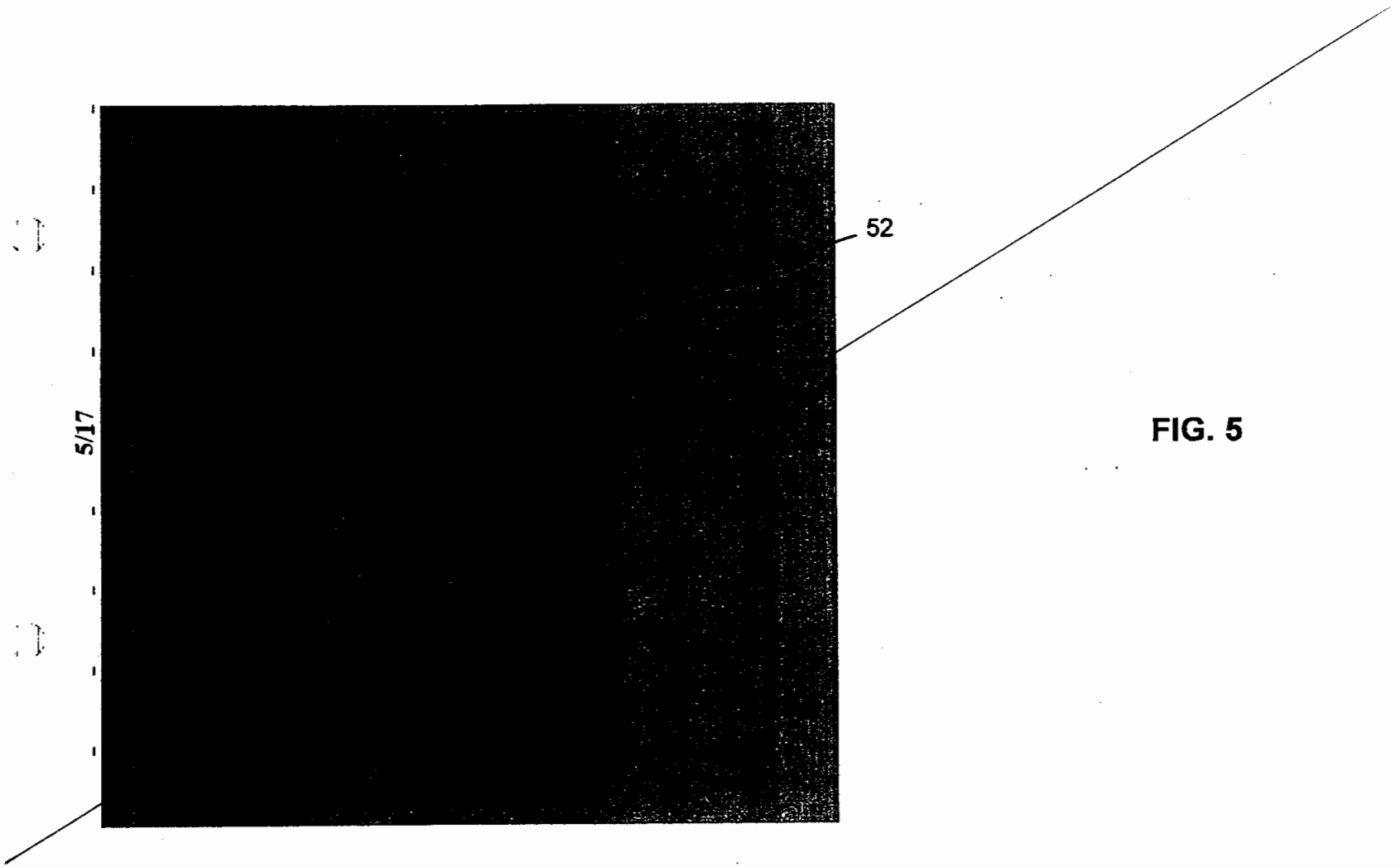
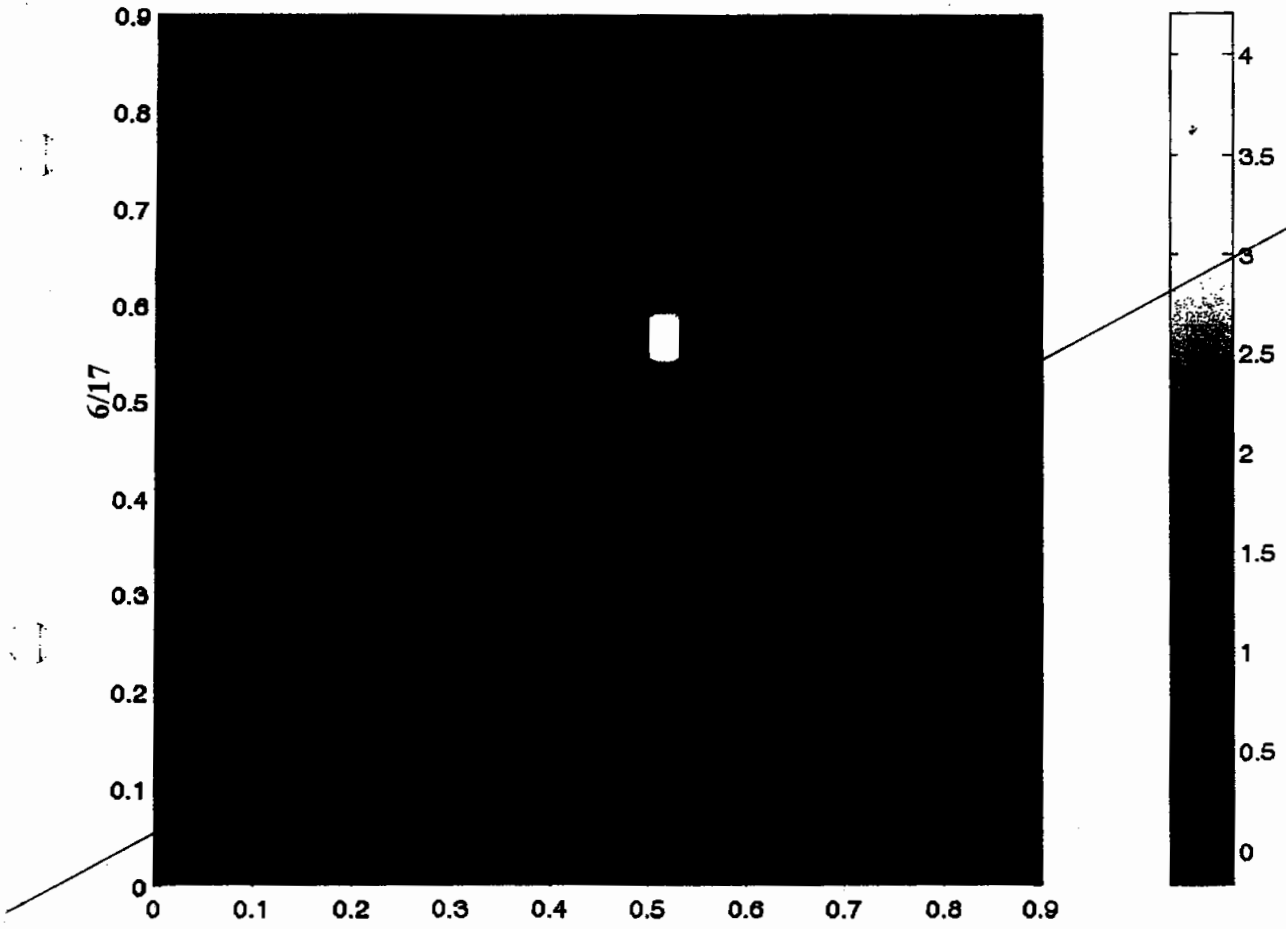


FIG. 5

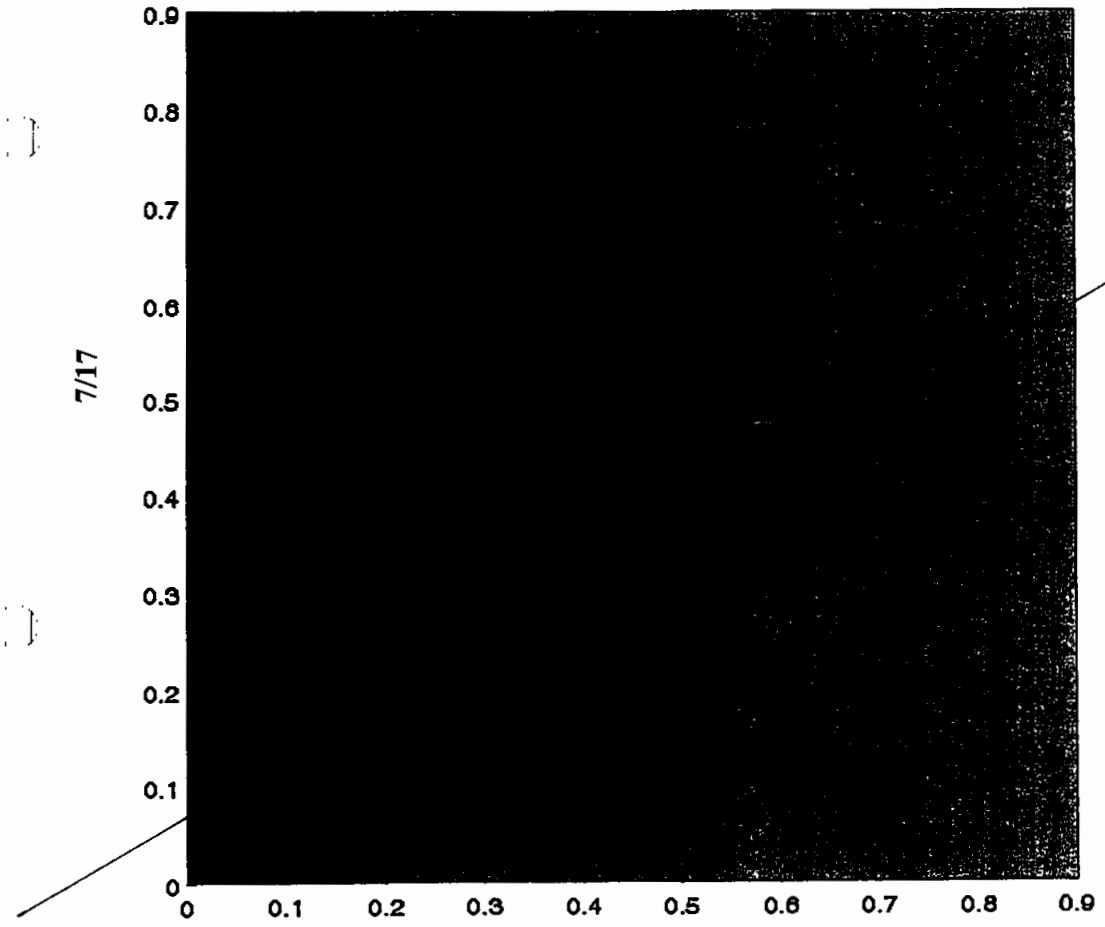
Interference Map after one iteration



Interference map generated with:
NA=1.2
λ=193nm
Annular illumination
σ_{in}=0.77 σ_{out}=0.97

FIG. 6

Mask after one iteration



- Red areas are assigned to Exposure #1
- Blue areas are assigned to Exposure #2

FIG. 7

Create a mask with the polygon with highest cost function

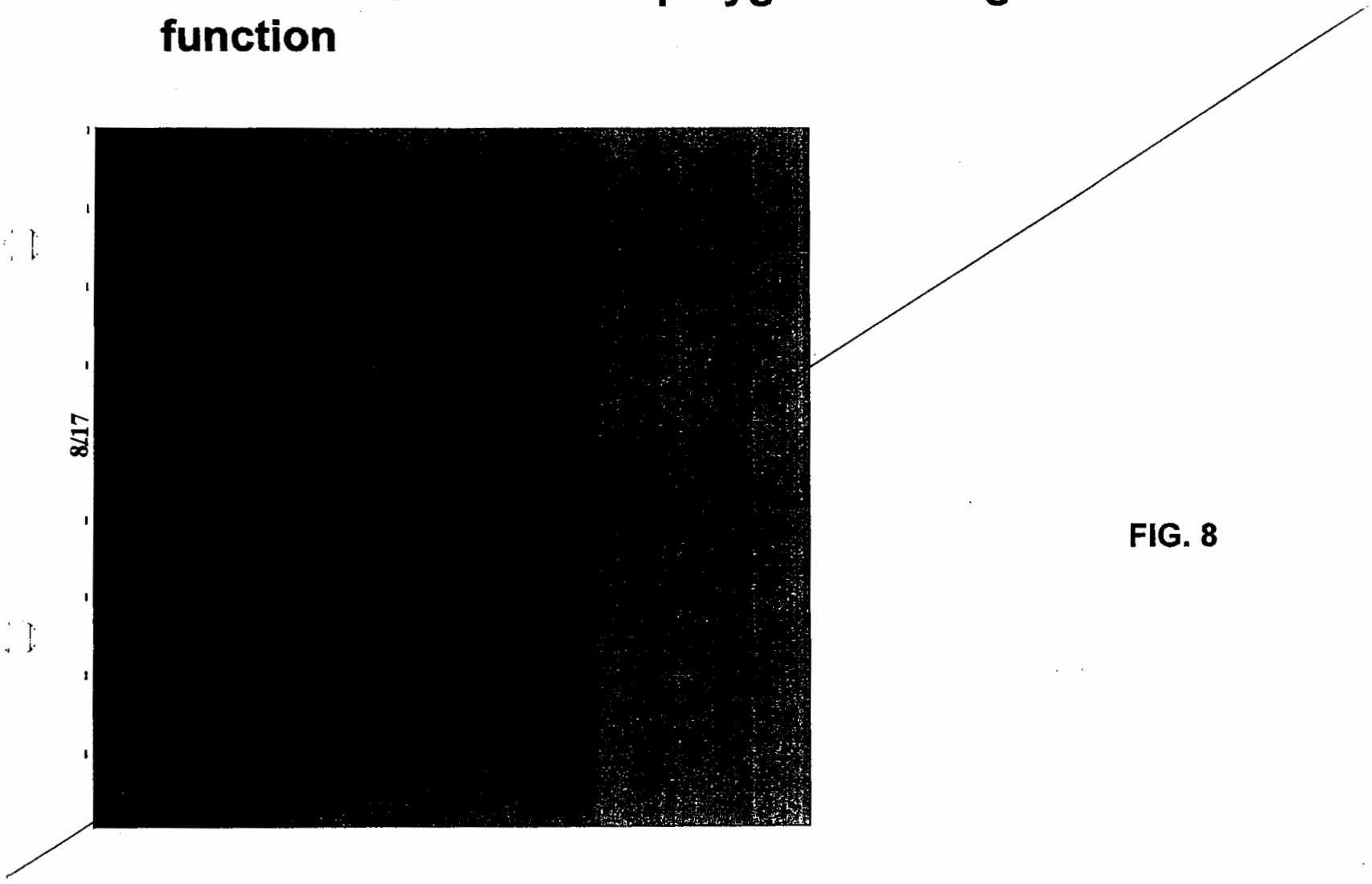
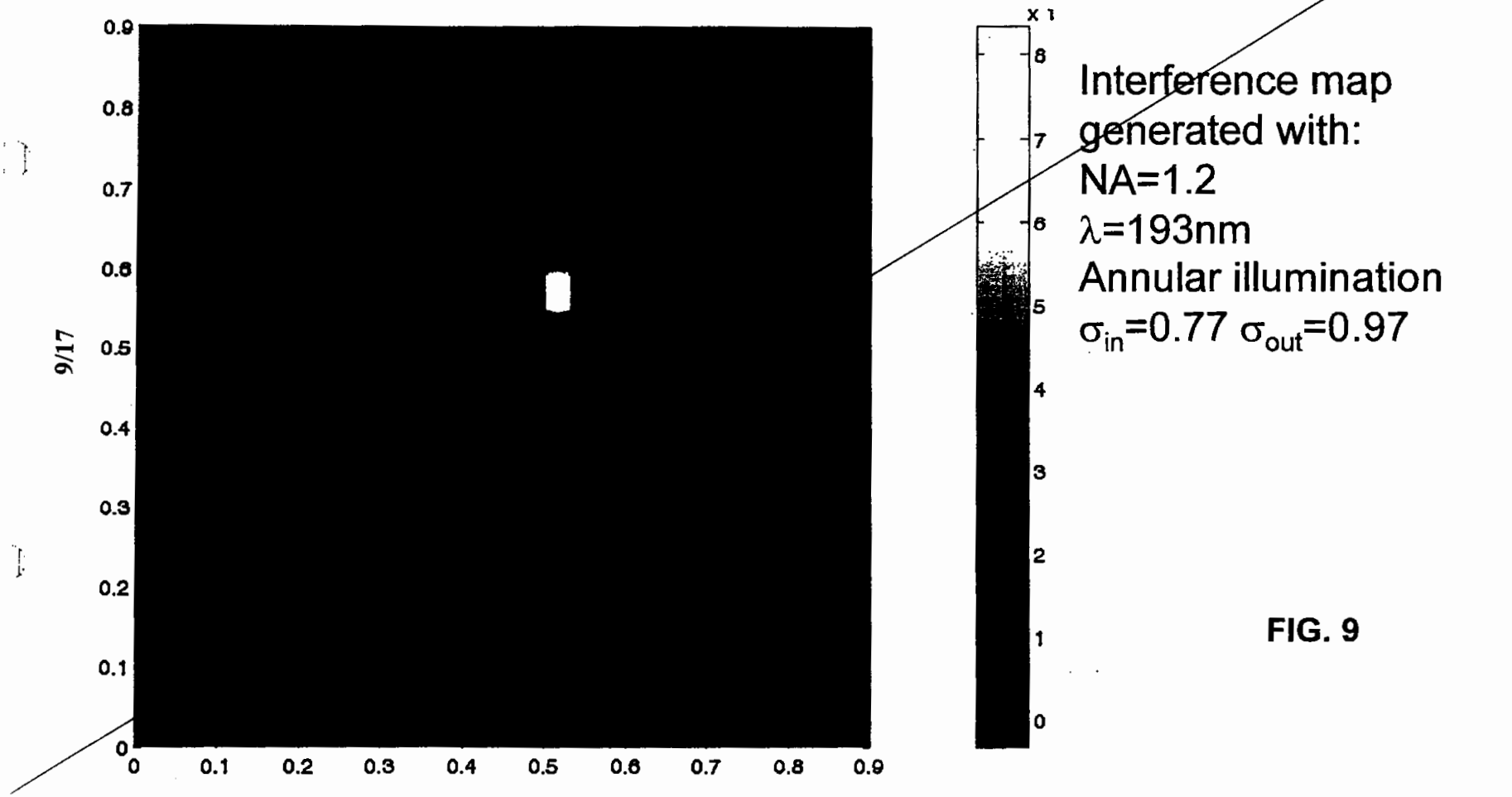


FIG. 8

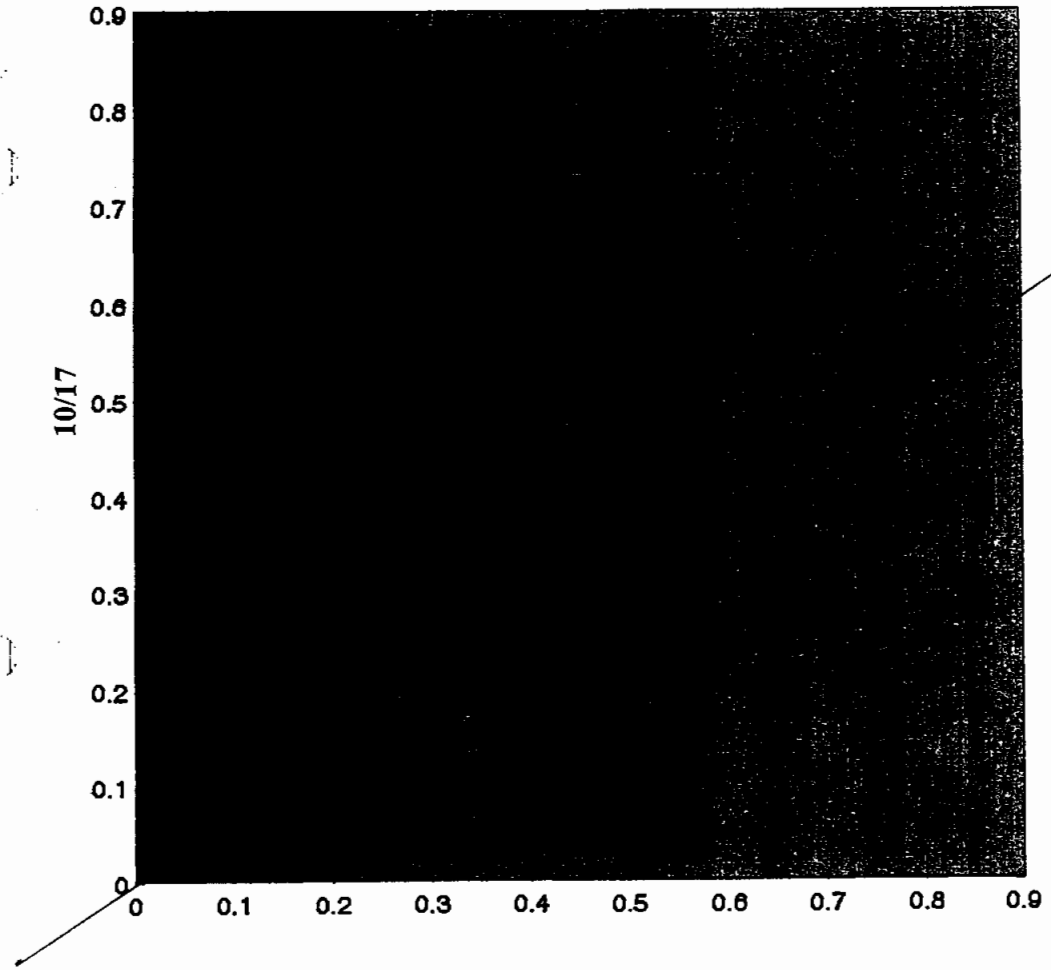
Total Interference Map after two iterations



Interference map generated with:
NA=1.2
λ=193nm
Annular illumination
σ_{in}=0.77 σ_{out}=0.97

FIG. 9

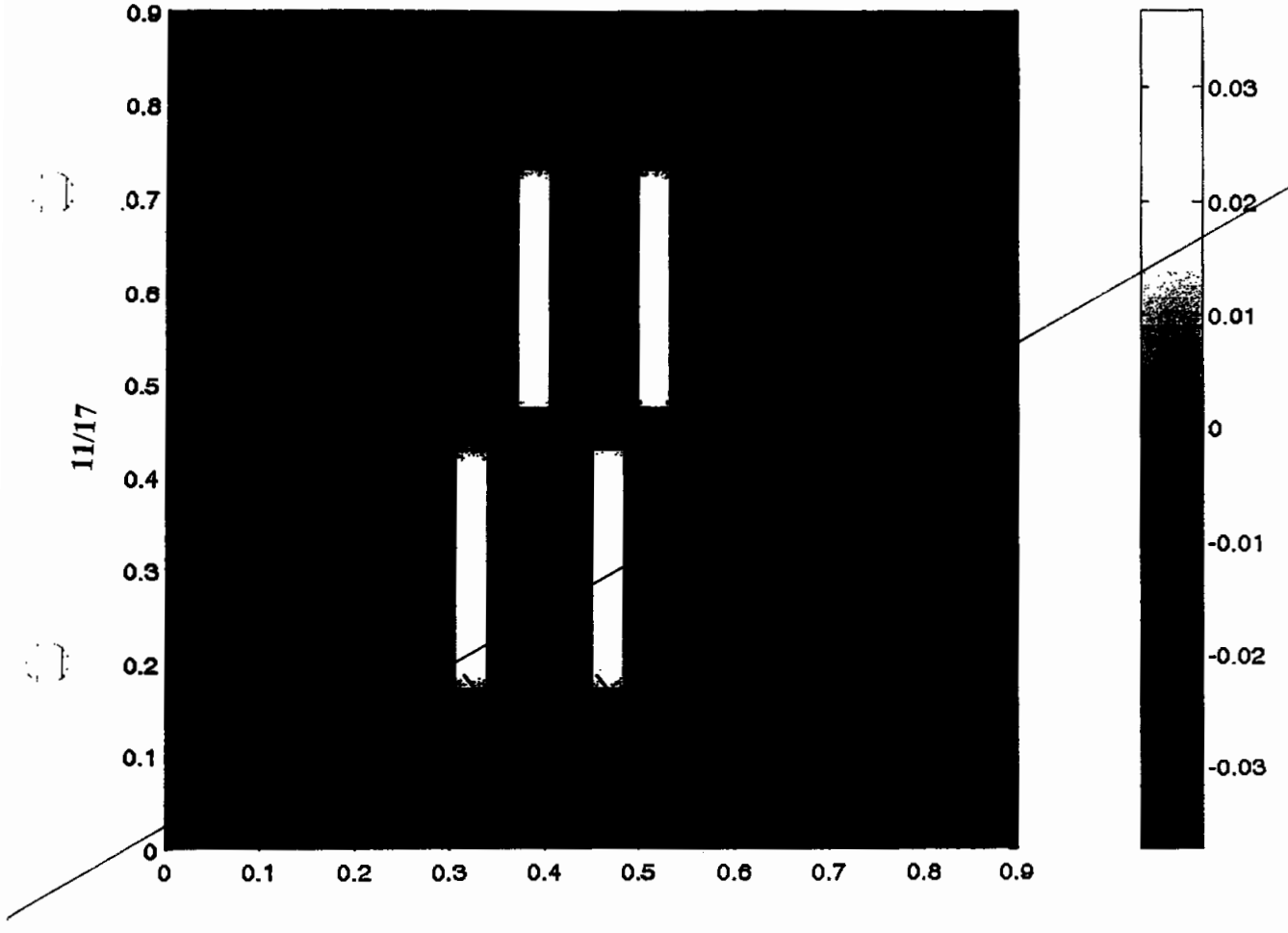
Mask after two iterations



- Red areas are assigned to Exposure #1
- Blue areas are assigned to Exposure #2

FIG. 10

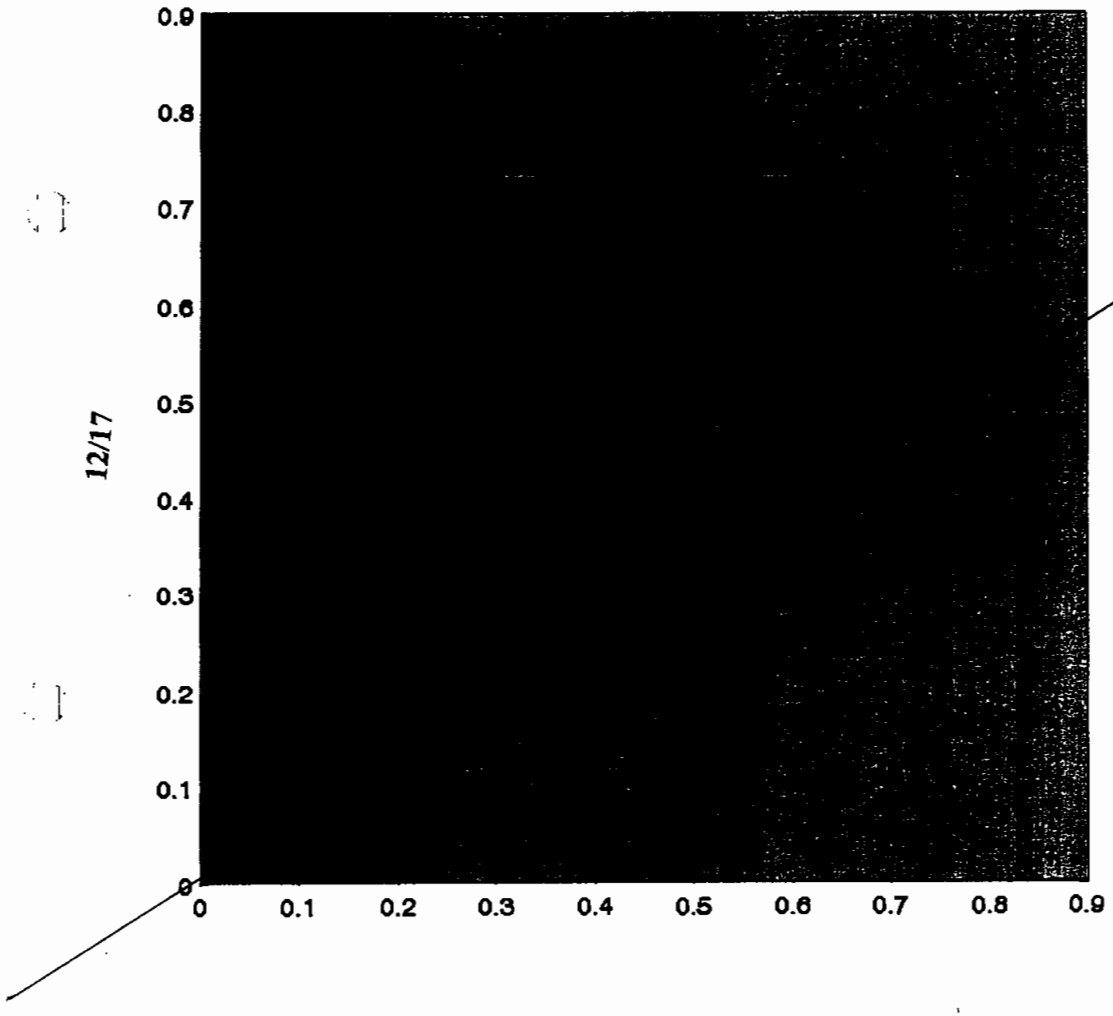
Total Interference Map after all iterations



Interference map generated with:
NA=1.2
λ=193nm
Annular illumination
σ_{in}=0.77 σ_{out}=0.97

FIG. 11

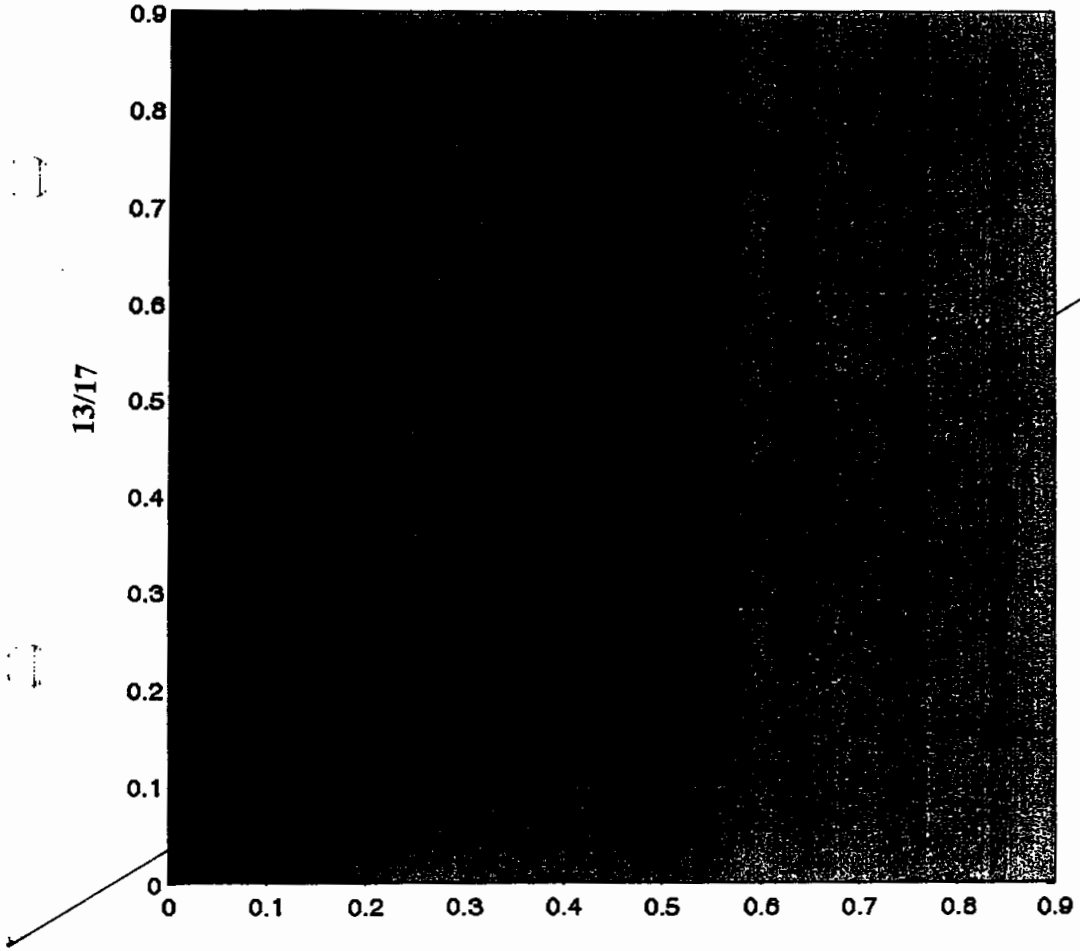
Mask after all iterations



- Red areas are assigned to Exposure #1
- Blue areas are assigned to Exposure #2

FIG. 12

Mask pattern to be split

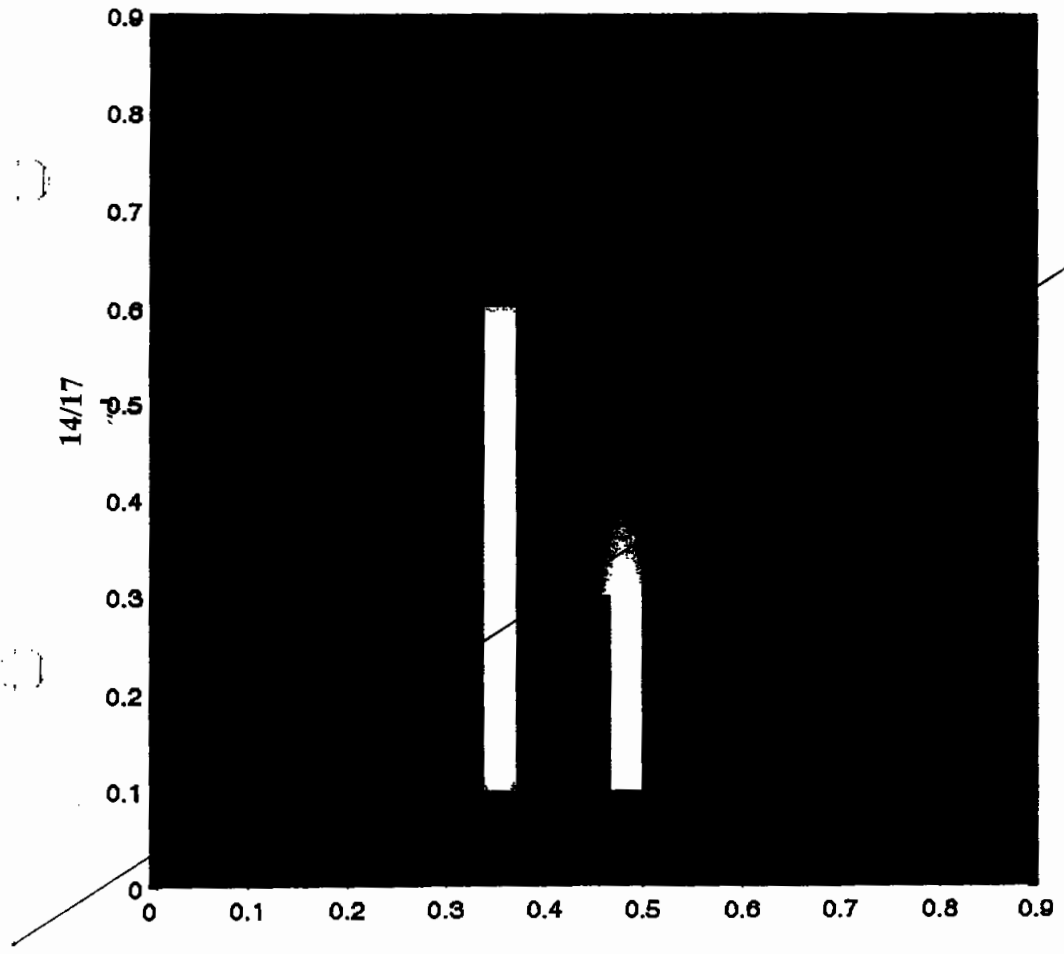


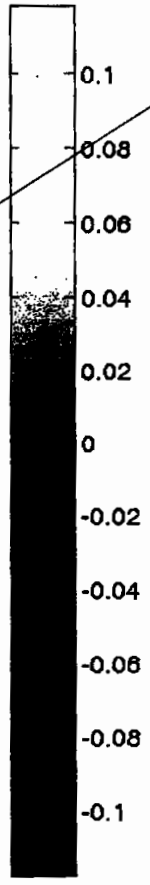
Min. half pitch=32.2nm
k_1=0.2
NA=1.2
λ=193nm

Annular illumination to be used
σ_{in}=0.77 σ_{out}=0.97

FIG. 13

Total Interference Map after all iterations

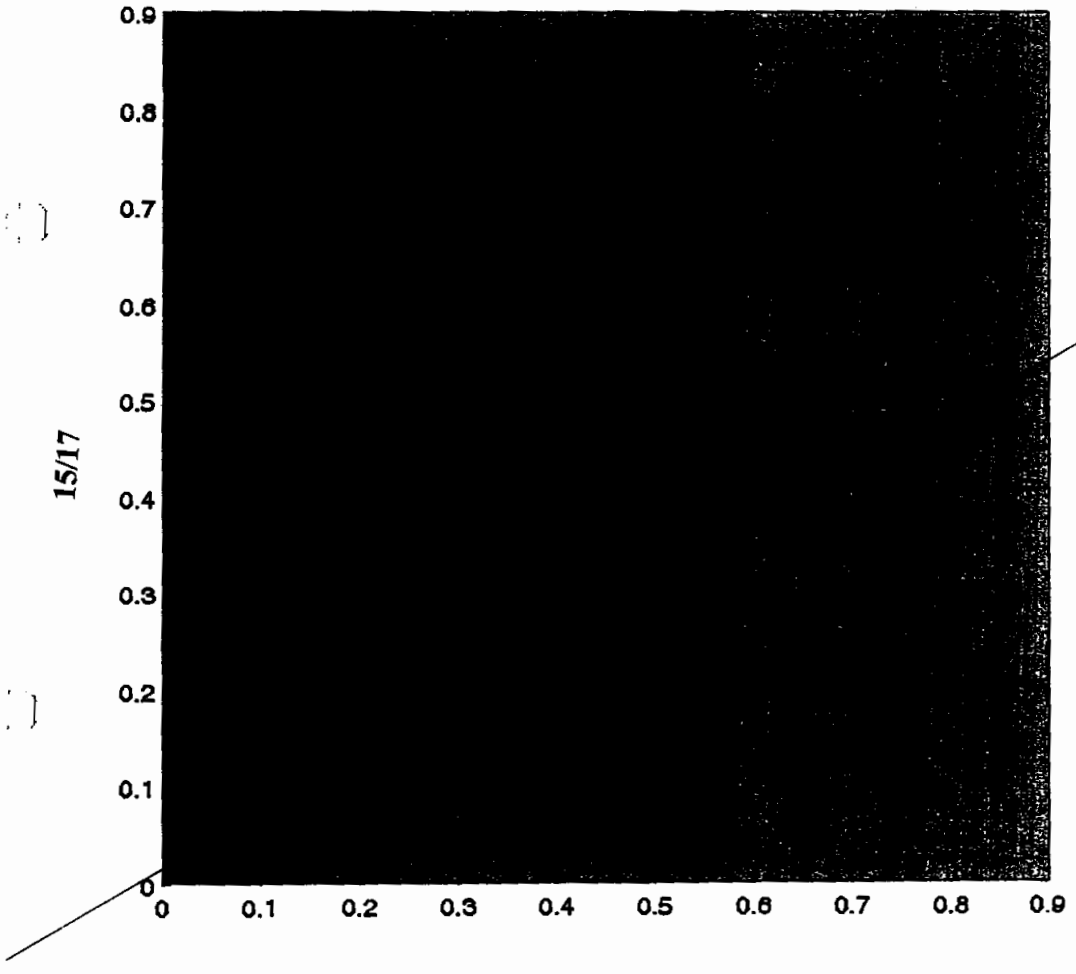




Interference map generated with:
NA=1.2
λ=193nm
Annular illumination
σ_{in}=0.77 σ_{out}=0.97

FIG. 14

Mask after all iterations



- Red areas are assigned to Exposure #1
- Blue areas are assigned to Exposure #2

FIG. 15

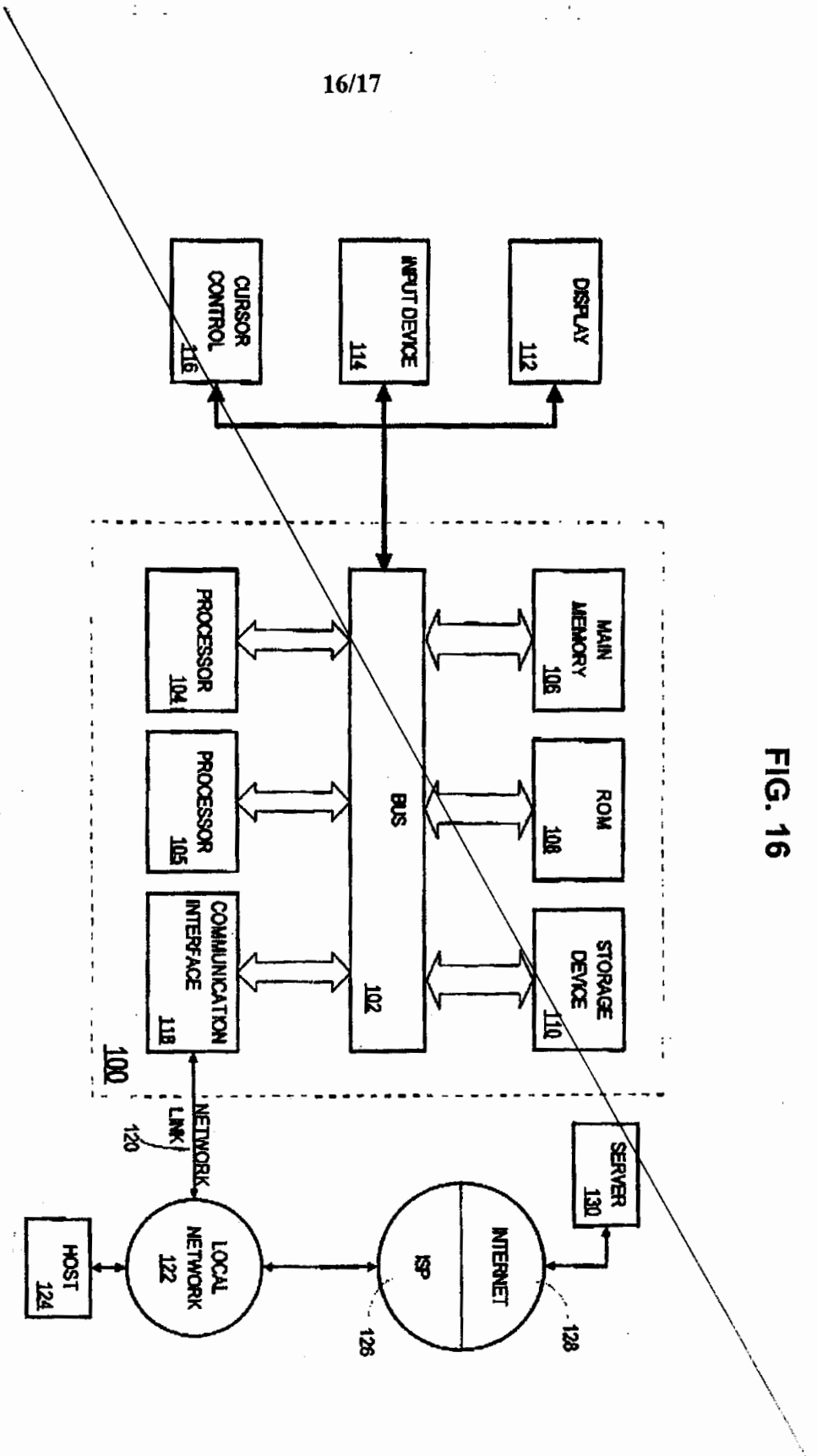

DISPLAY
112
INPUT DEVICE
114
CURSOR CONTROL
116
MAIN MEMORY
106
PROCESSOR
104
PROCESSOR
105
BUS
102
ROM
108
COMMUNICATION INTERFACE
118
STORAGE DEVICE
110
100
NETWORK LINK
120
SERVER
130
HOST
124
LOCAL NETWORK
122
ISP
126
INTERNET
128

FIG. 16

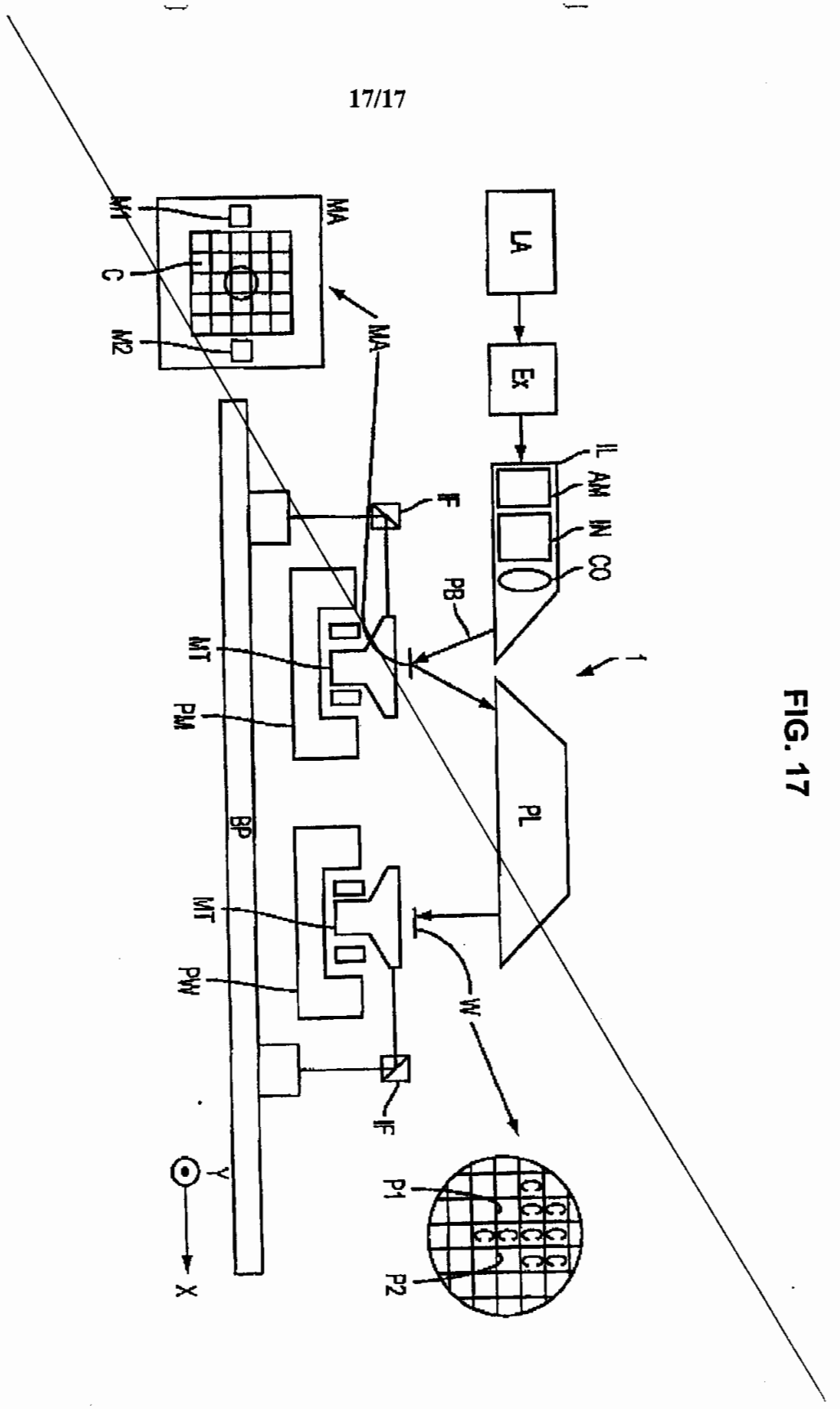


FIG. 17

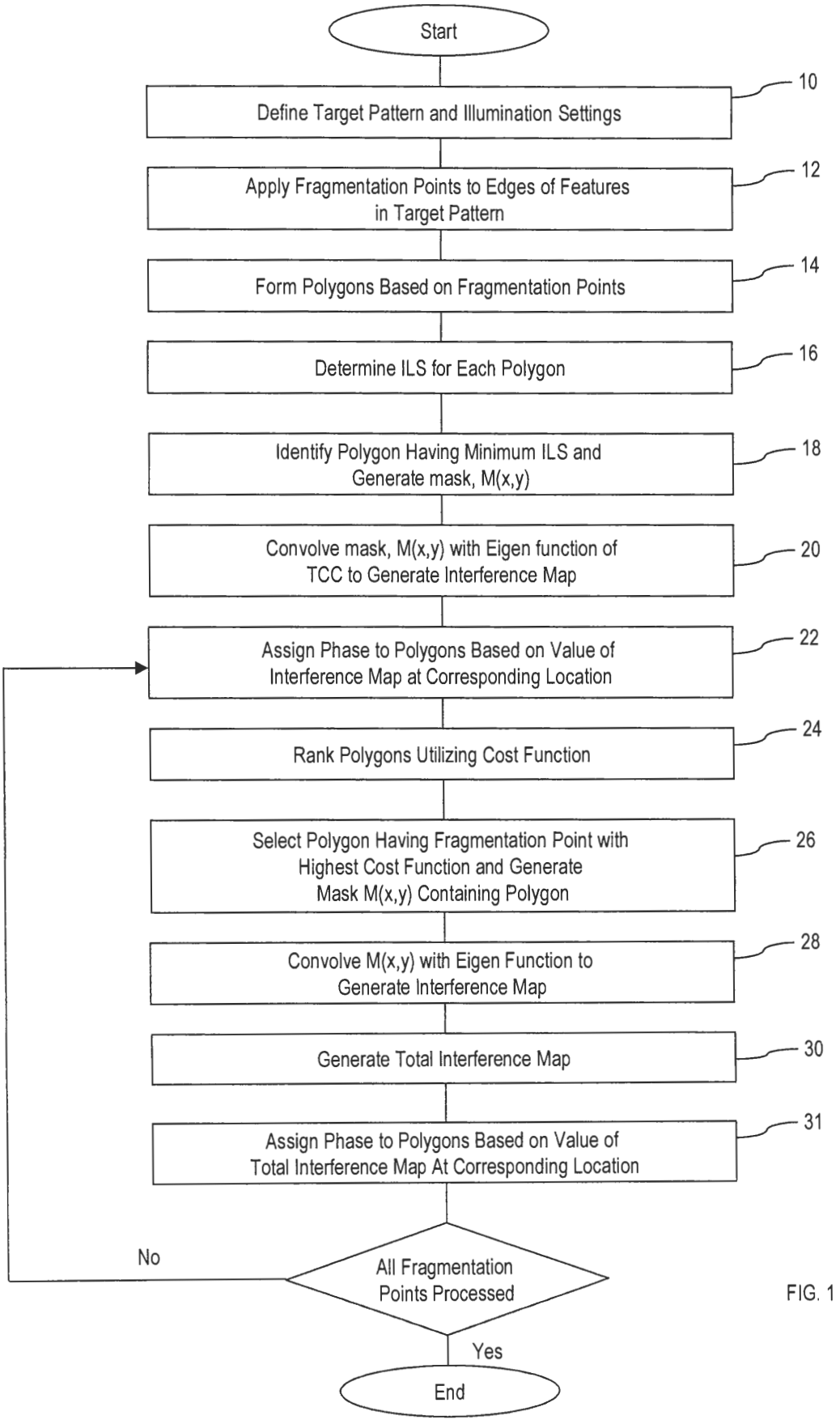
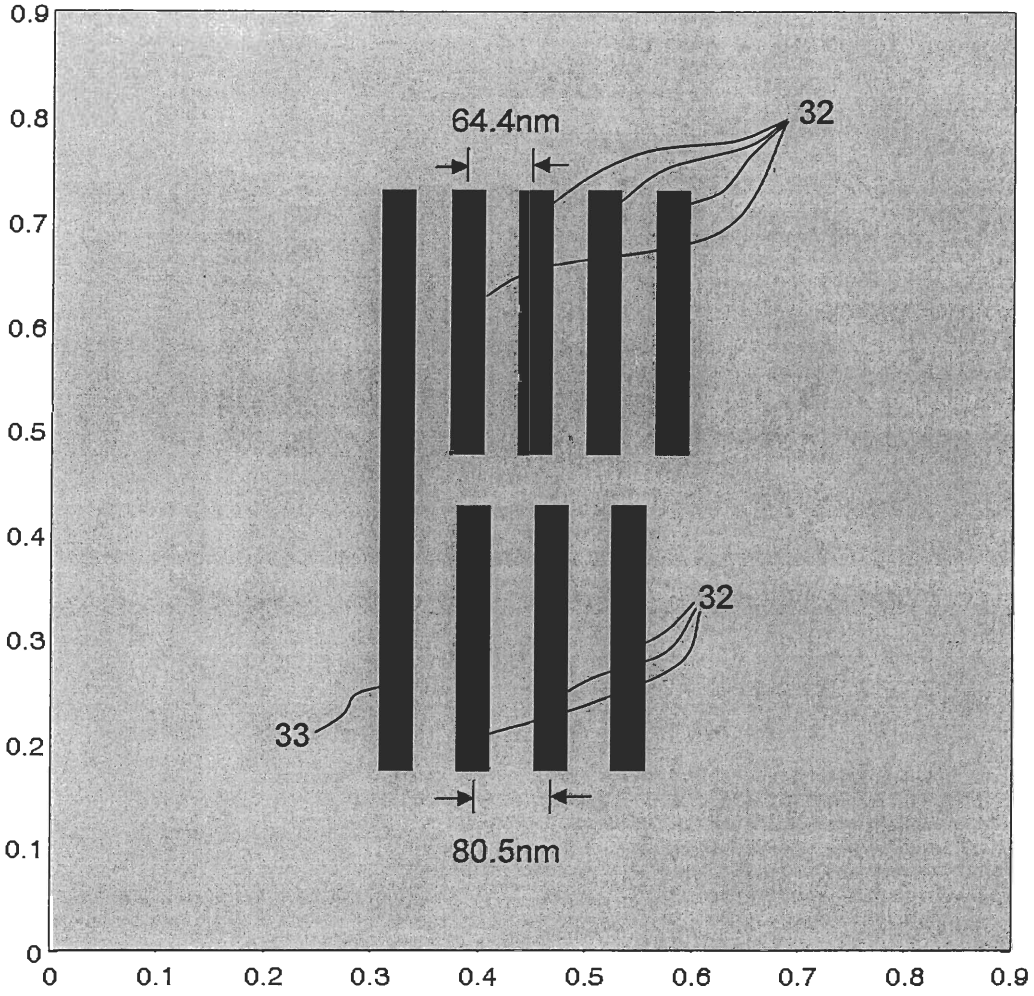

Start
Define Target Pattern and Illumination Settings
10
Apply Fragmentation Points to Edges of Features in Target Pattern
12
Form Polygons Based on Fragmentation Points
14
Determine ILS for Each Polygon
16
Identify Polygon Having Minimum ILS and Generate mask, M(x,y)
18
Convolve mask, M(x,y) with Eigen function of TCC to Generate Interference Map
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Assign Phase to Polygons Based on Value of Interference Map at Corresponding Location
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Rank Polygons Utilizing Cost Function
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Select Polygon Having Fragmentation Point with Highest Cost Function and Generate Mask M(x,y) Containing Polygon
26
Convolve M(x,y) with Eigen Function to Generate Interference Map
28
Generate Total Interference Map
30
Assign Phase to Polygons Based on Value of Total Interference Map At Corresponding Location
31
All Fragmentation Points Processed
No
Yes
End

FIG. 1

Mask pattern to be split



Min. half pitch=32.2nm
k_1=0.2
NA=1.2
λ=193nm

Annular illumination to be used
σ_{in}=0.77 σ_{out}=0.97

FIG. 2

Apply snippets

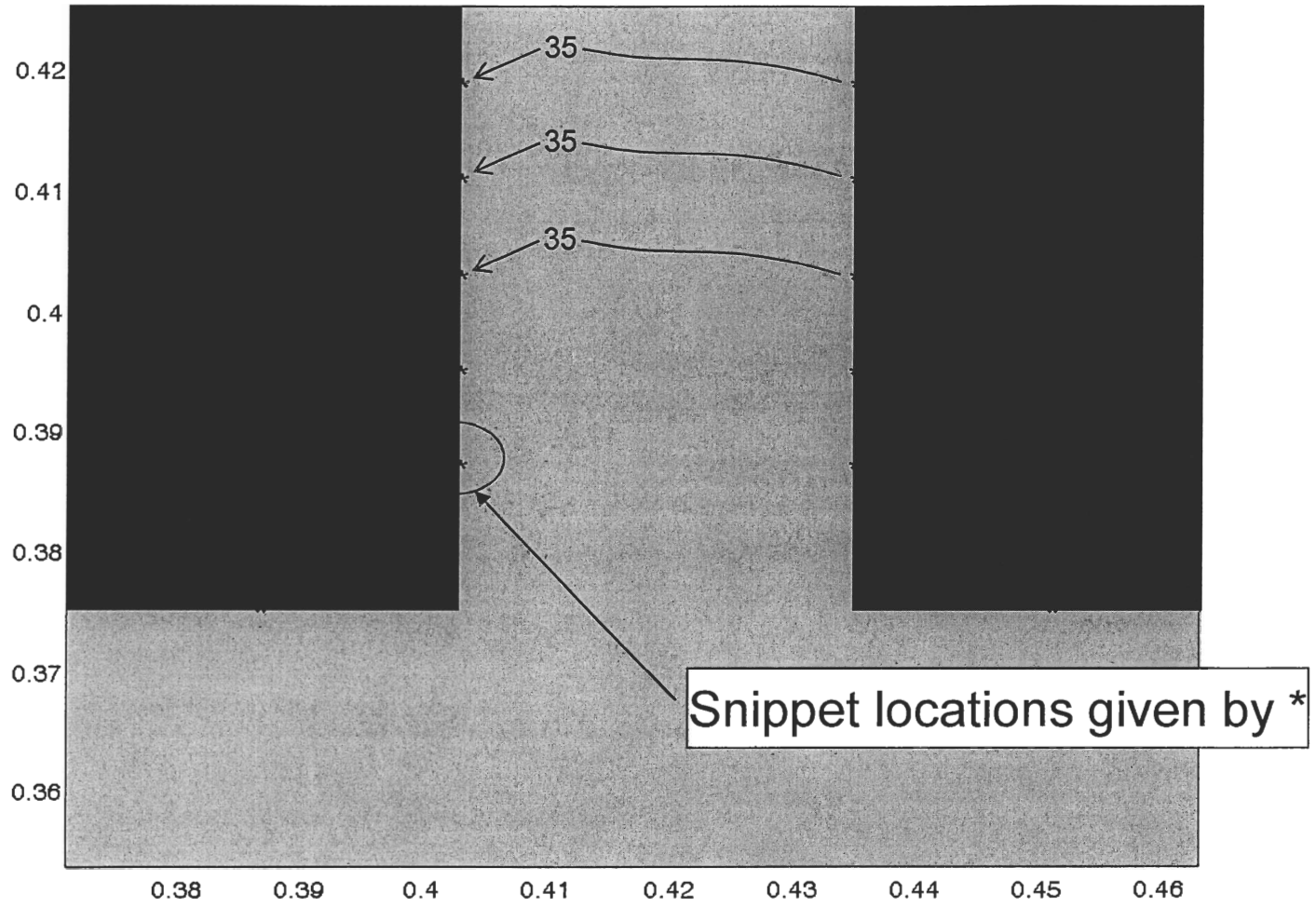
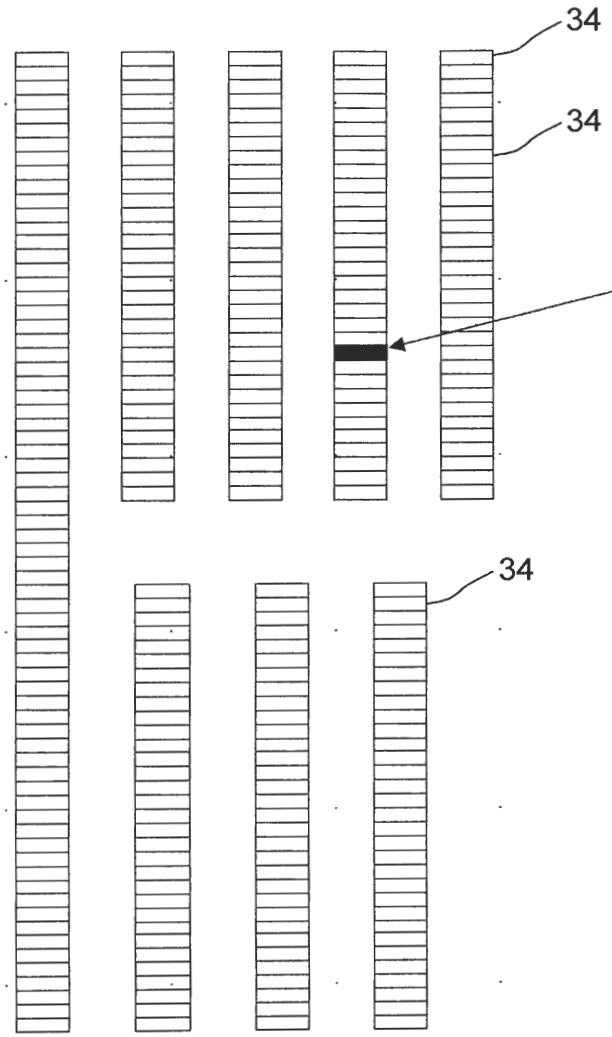


FIG. 3

Create Polygons from the snippets



The location with the minimum ILS is the seed location. The first interference map will be generated from this seed mask

FIG. 4

Create a mask with the polygon with lowest ILS

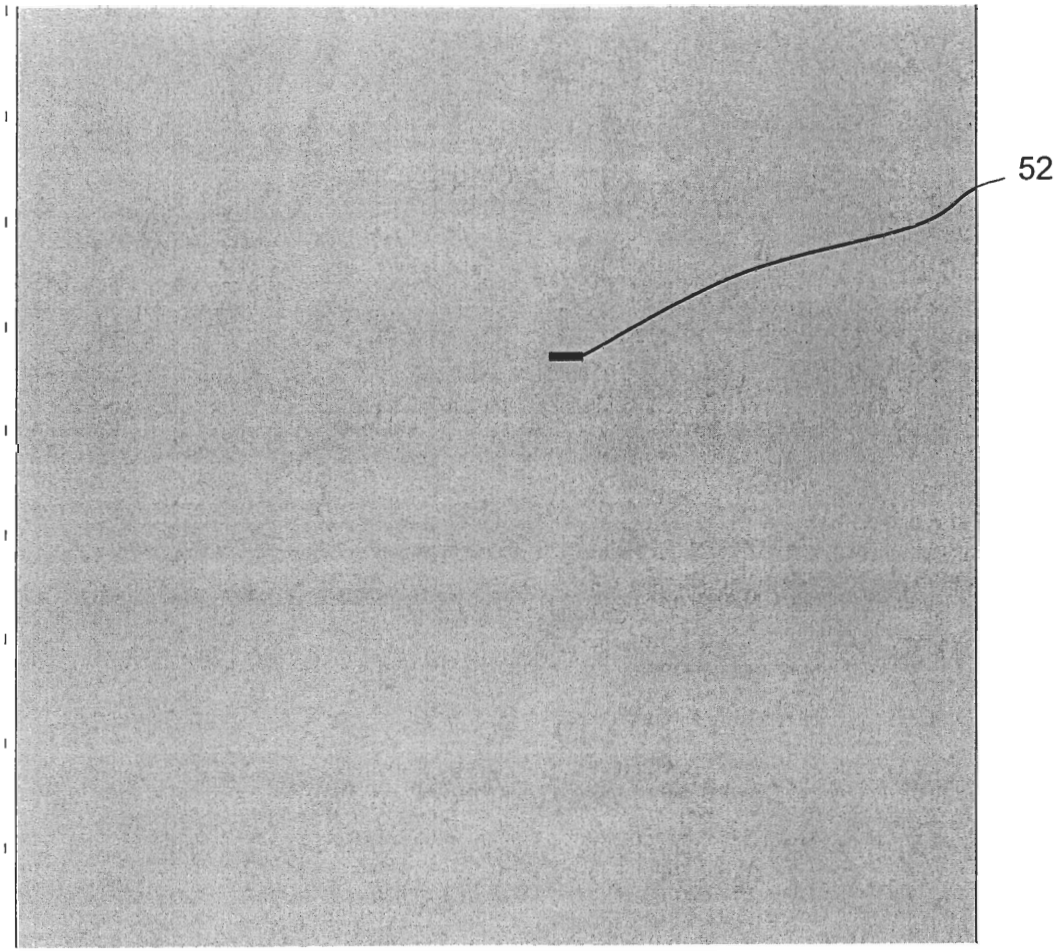
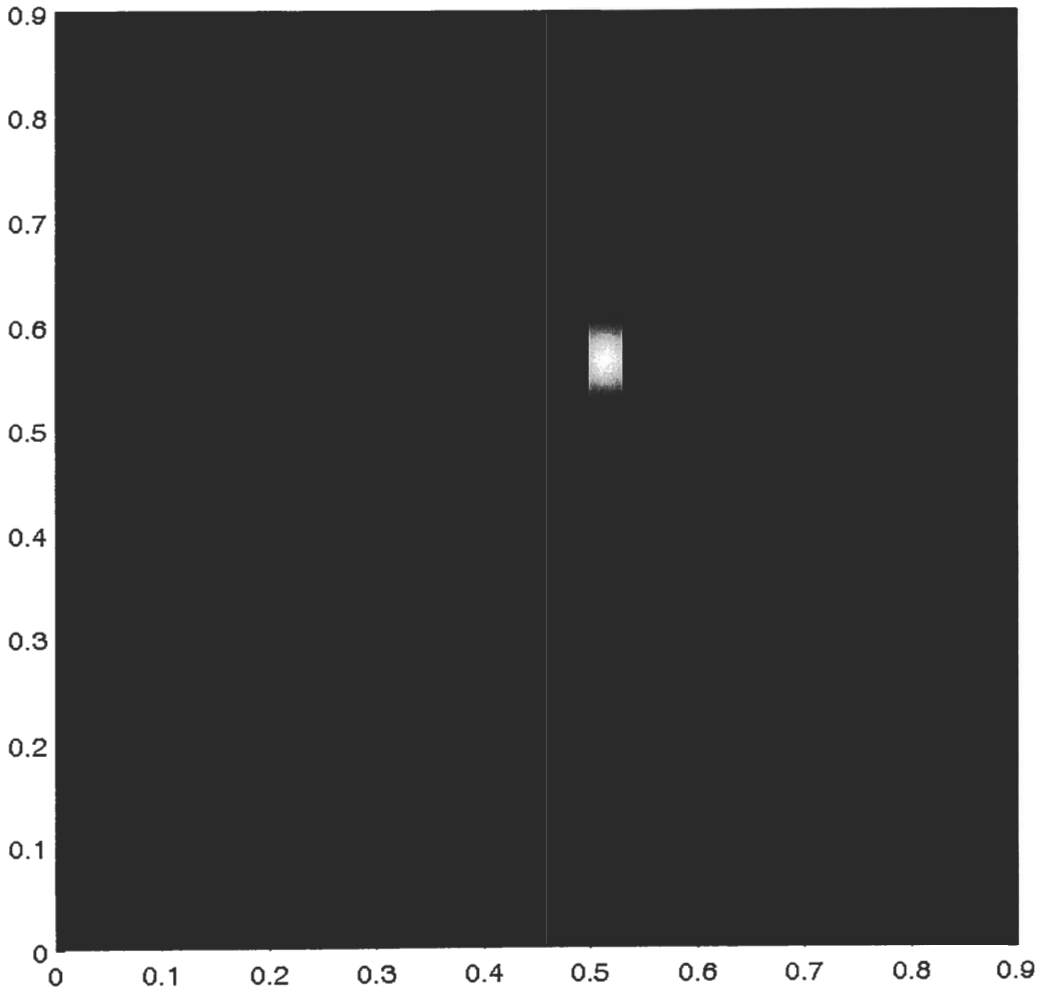
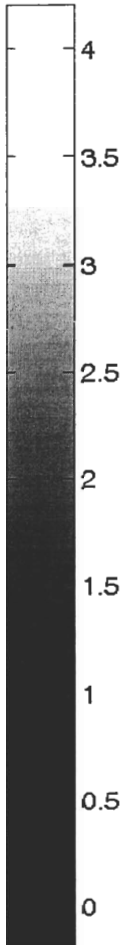


FIG. 5

Interference Map after one iteration



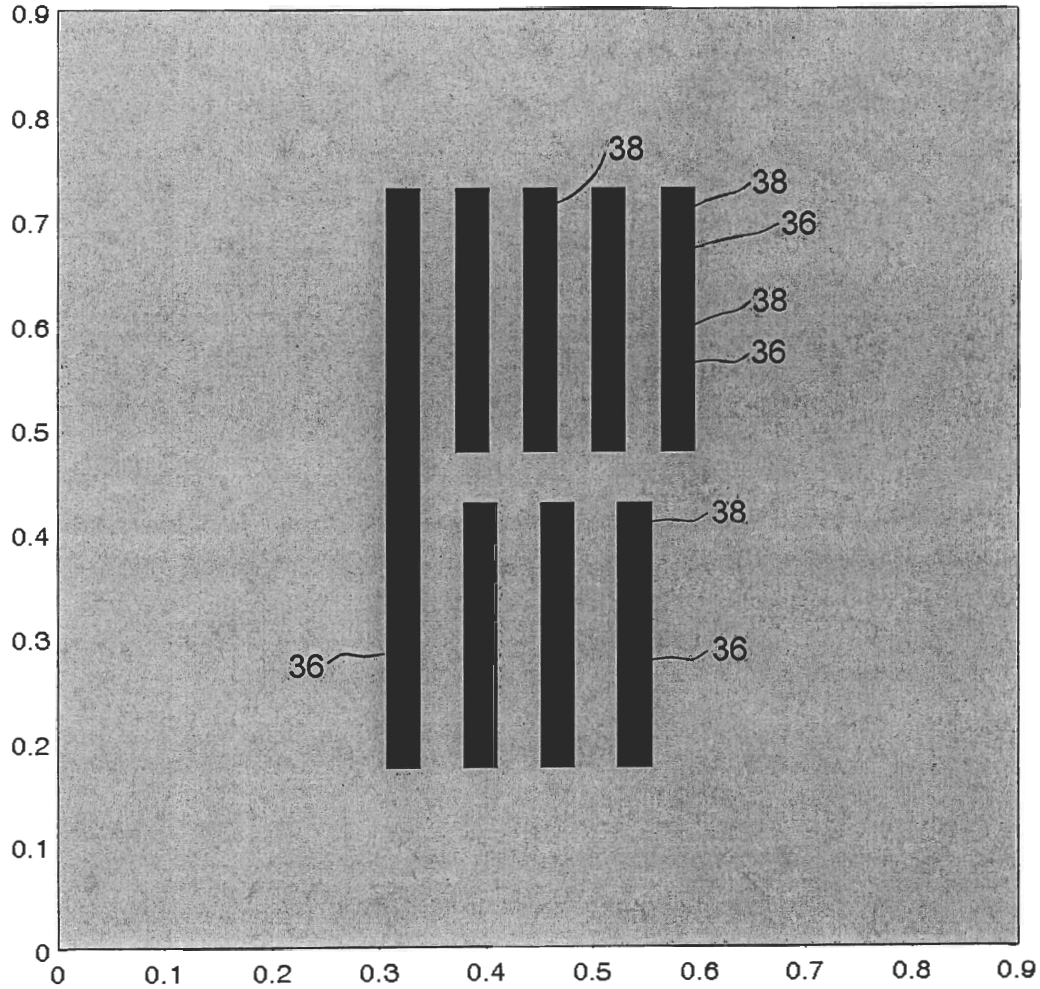


Interference map generated with:
NA=1.2
λ=193nm
Annular illumination
σ_{in}=0.77 σ_{out}=0.97

FIG. 6

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Mask after one iteration



- Red areas are assigned to Exposure #1
- Blue areas are assigned to Exposure #2

FIG. 7

Create a mask with the polygon with highest cost function

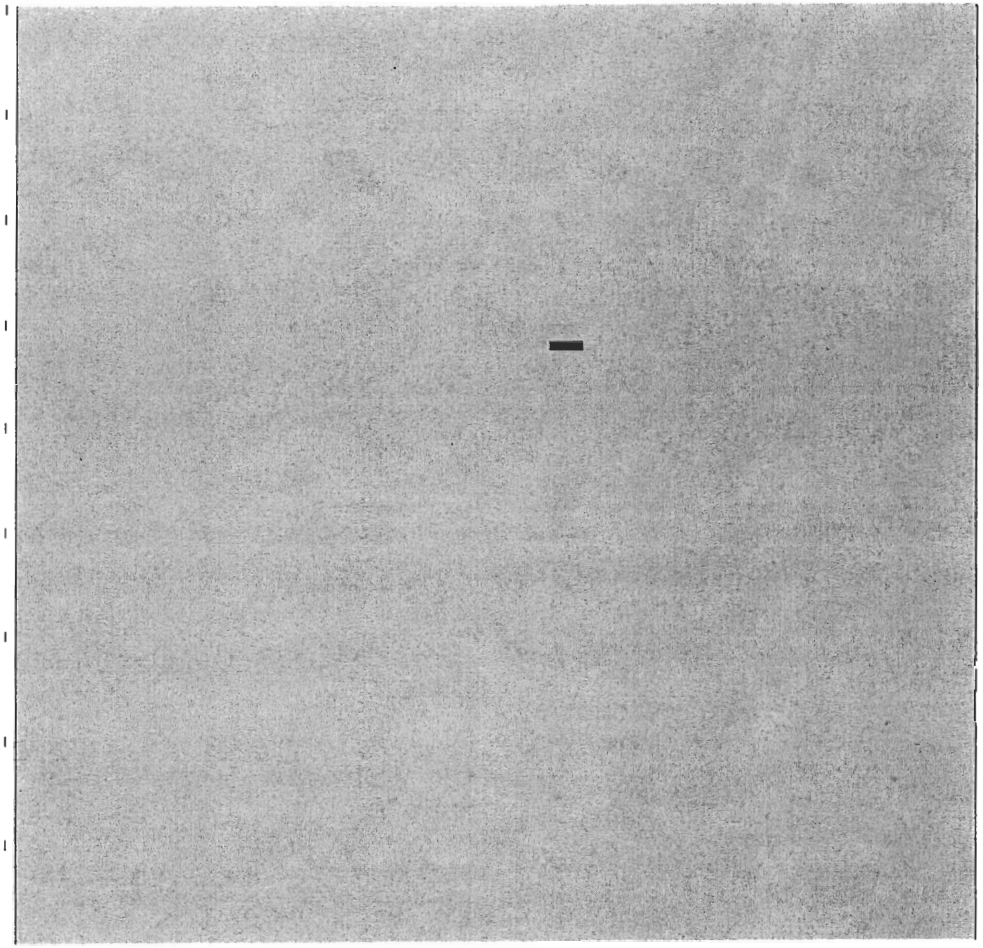
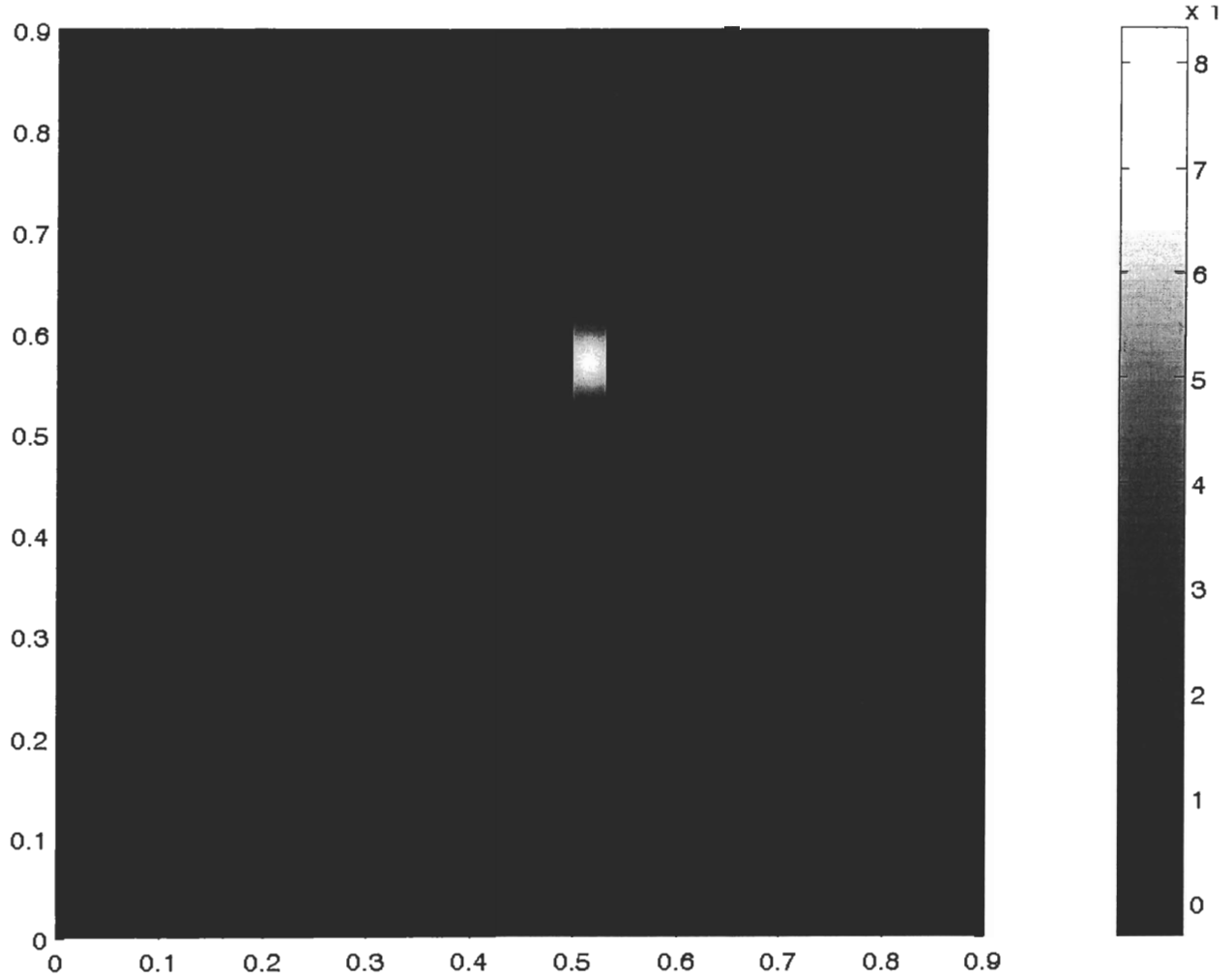


FIG. 8

Total Interference Map after two iterations

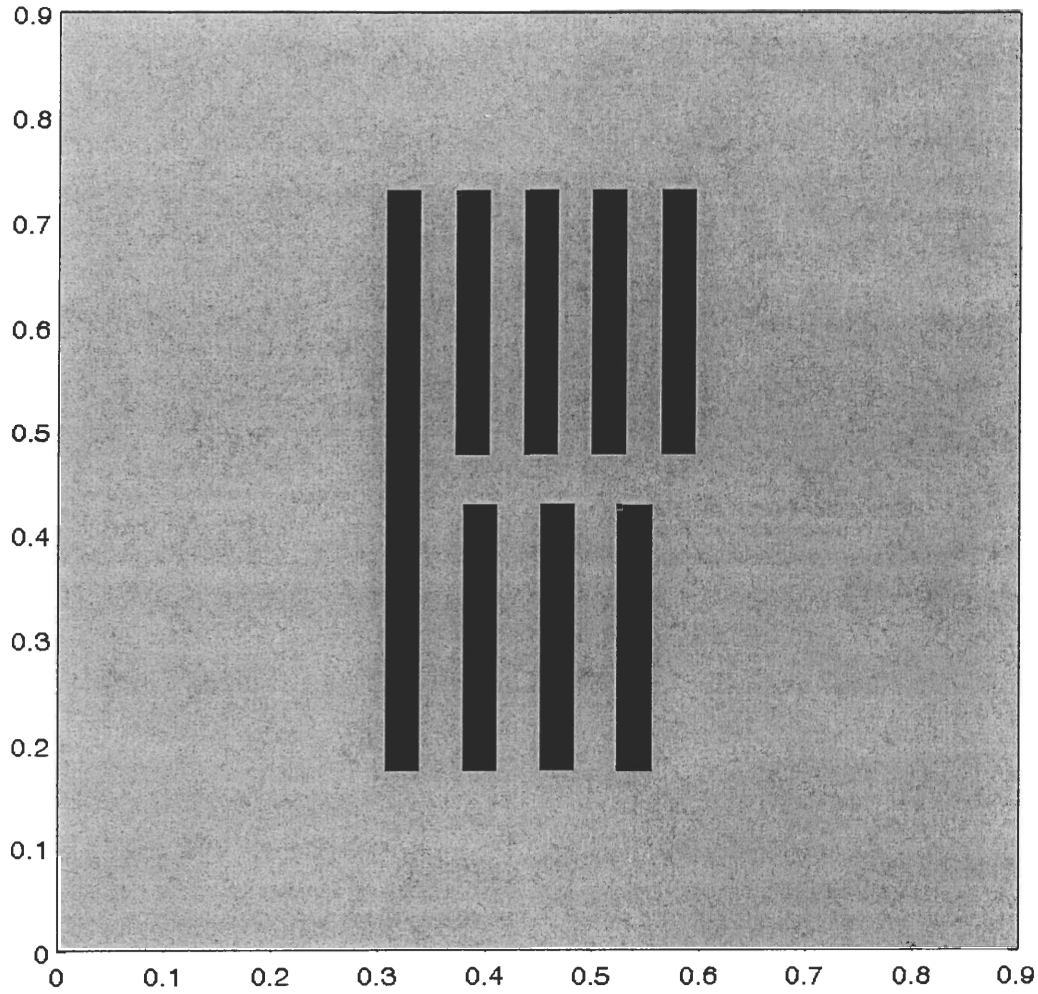


Interference map generated with:
NA=1.2
λ=193nm
Annular illumination
σ_{in}=0.77 σ_{out}=0.97

FIG. 9

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Mask after two iterations

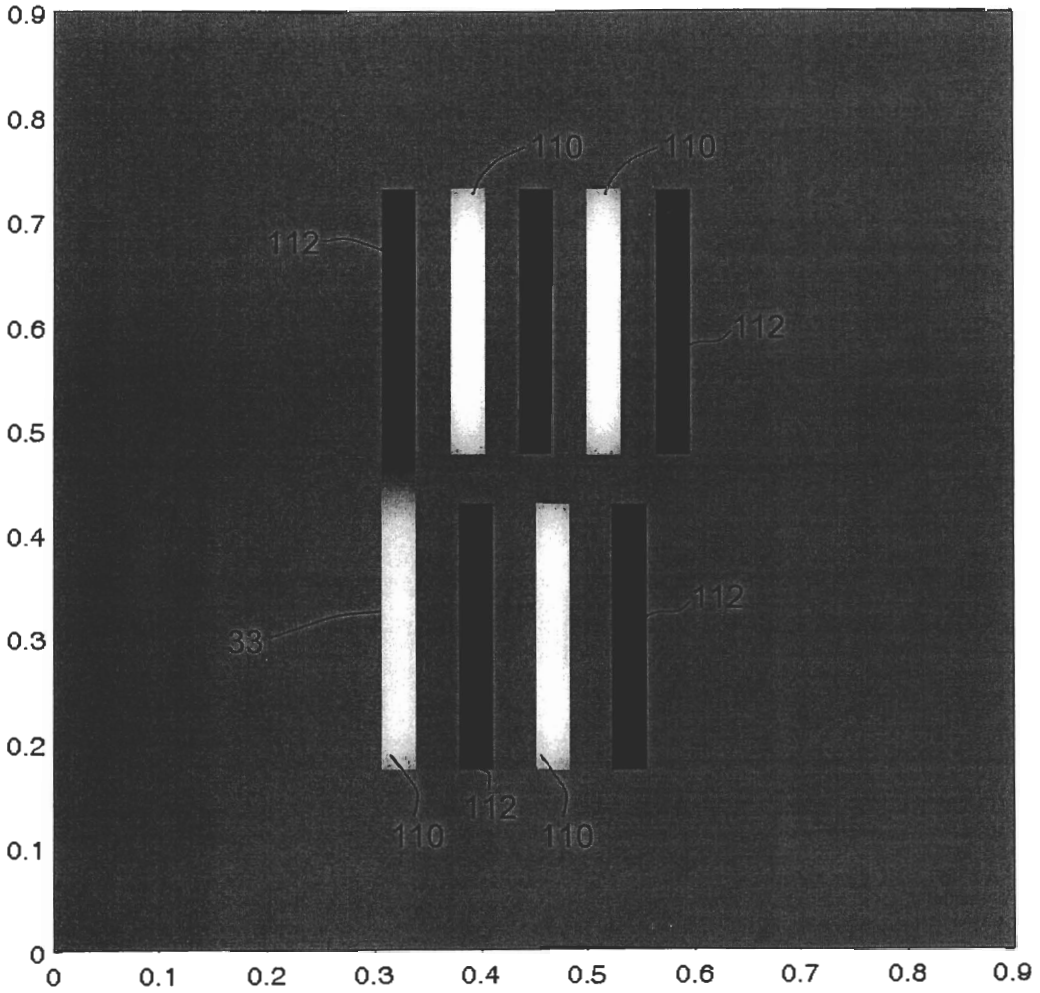


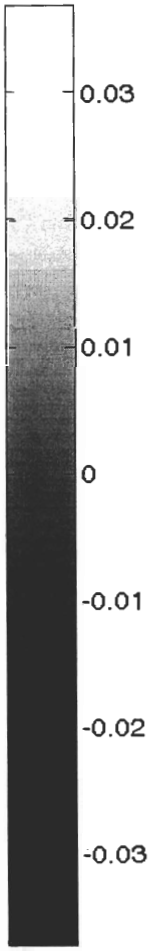
- Red areas are assigned to Exposure #1
- Blue areas are assigned to Exposure #2

FIG. 10

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Total Interference Map after all iterations



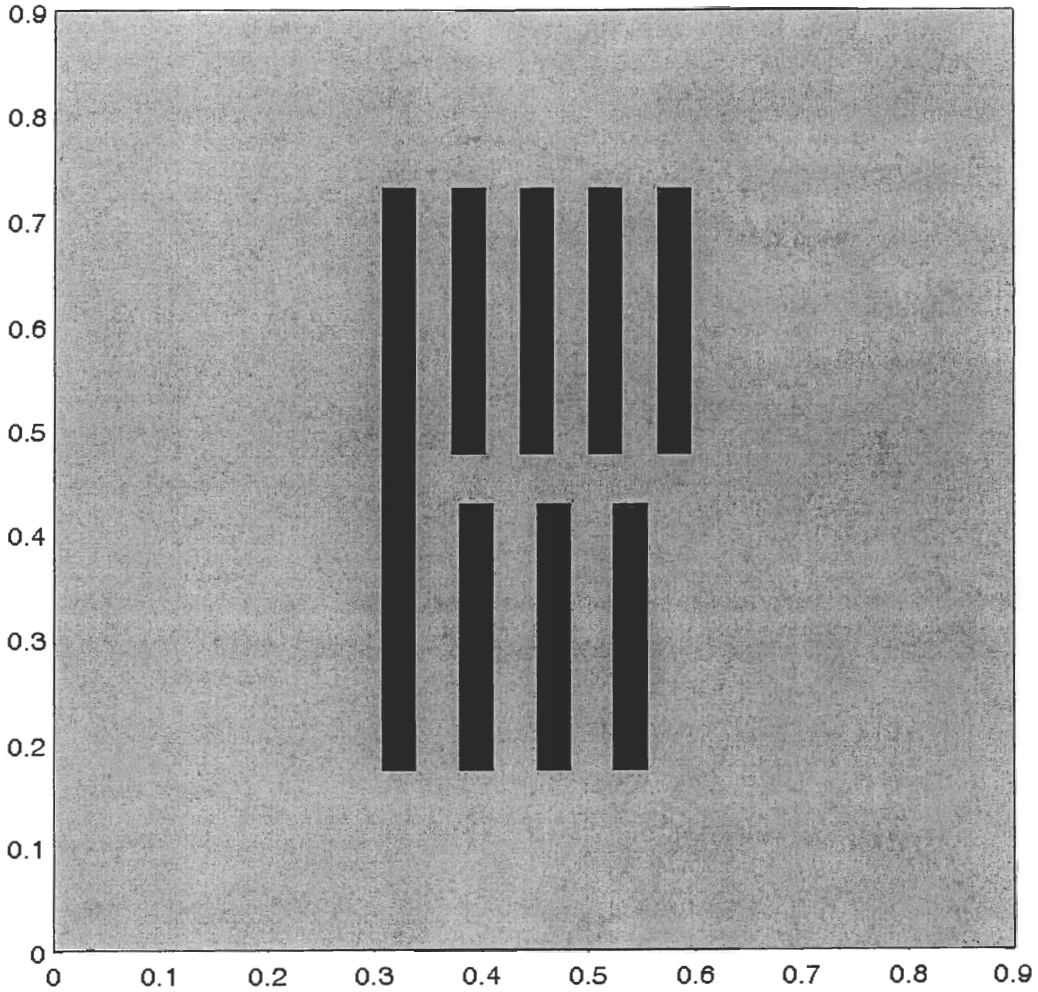


Interference map generated with:
NA=1.2
λ=193nm
Annular illumination
σ_{in}=0.77 σ_{out}=0.97

FIG. 11

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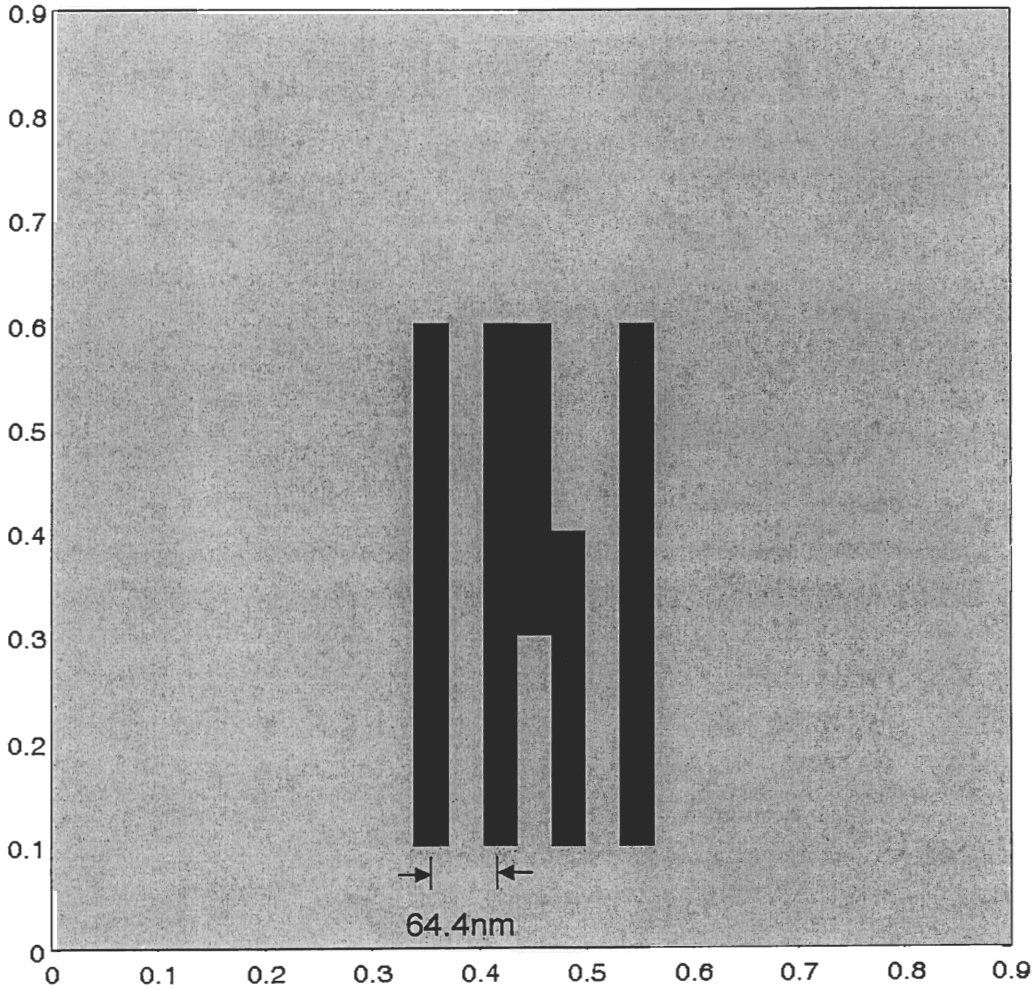
Mask after all iterations



- Red areas are assigned to Exposure #1
- Blue areas are assigned to Exposure #2

FIG. 12

Mask pattern to be split



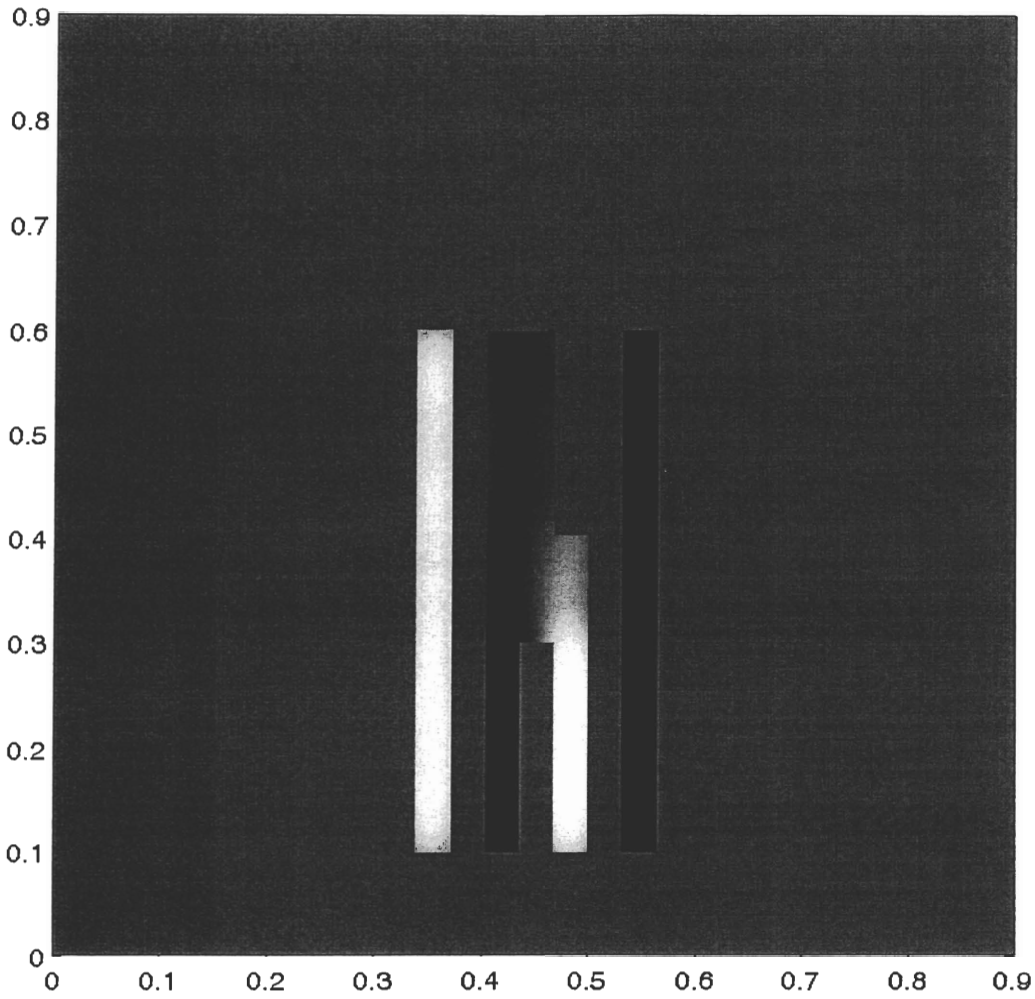
Min. half pitch=32.2nm
k_1=0.2
NA=1.2
λ=193nm

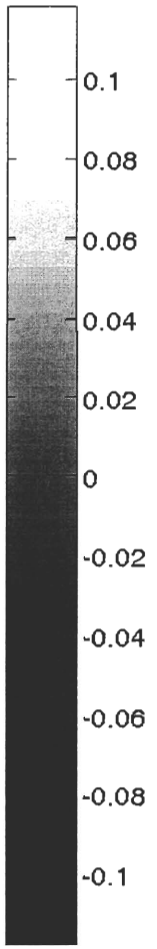
Annular illumination to be used
σ_{in}=0.77 σ_{out}=0.97

FIG. 13

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Total Interference Map after all iterations

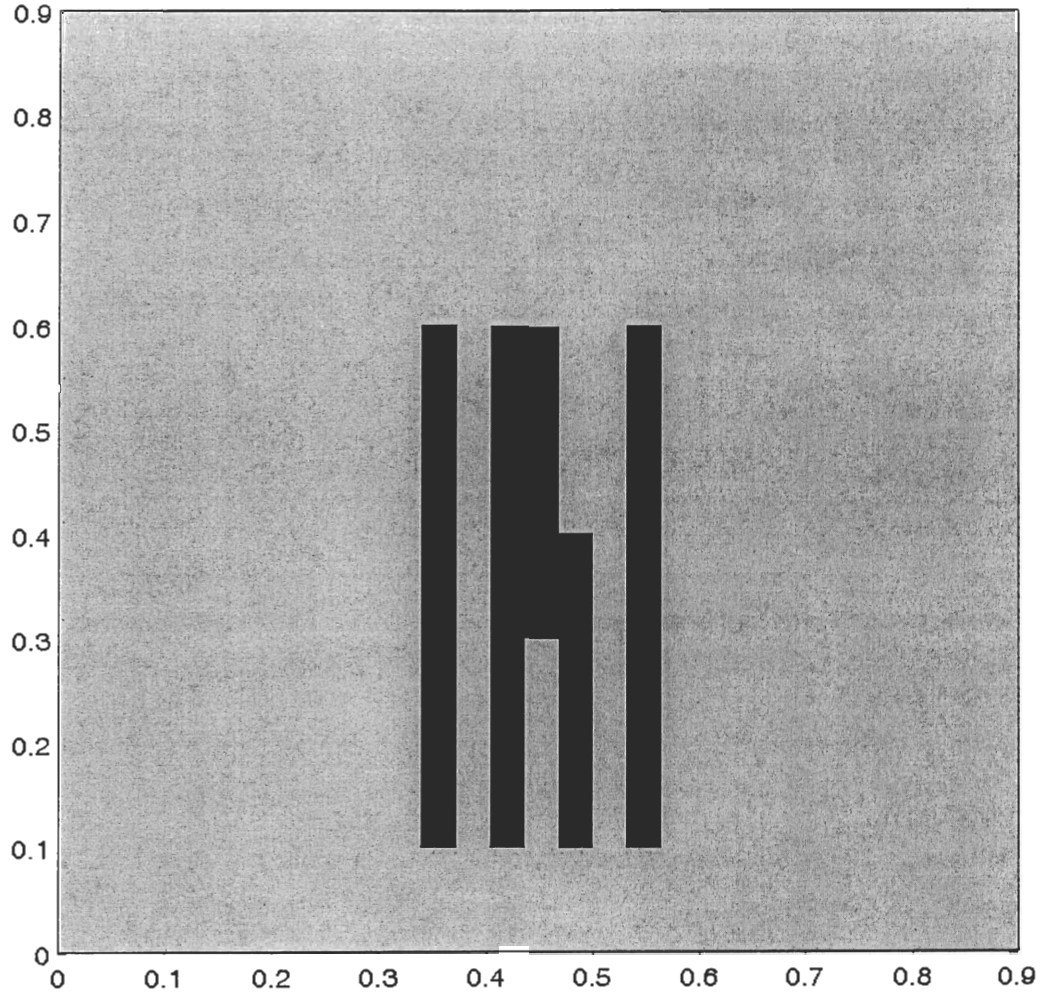




Interference map generated with:
NA=1.2
λ=193nm
Annular illumination
σ_{in}=0.77 σ_{out}=0.97

FIG. 14

Mask after all iterations



- Red areas are assigned to Exposure #1
- Blue areas are assigned to Exposure #2

FIG. 15

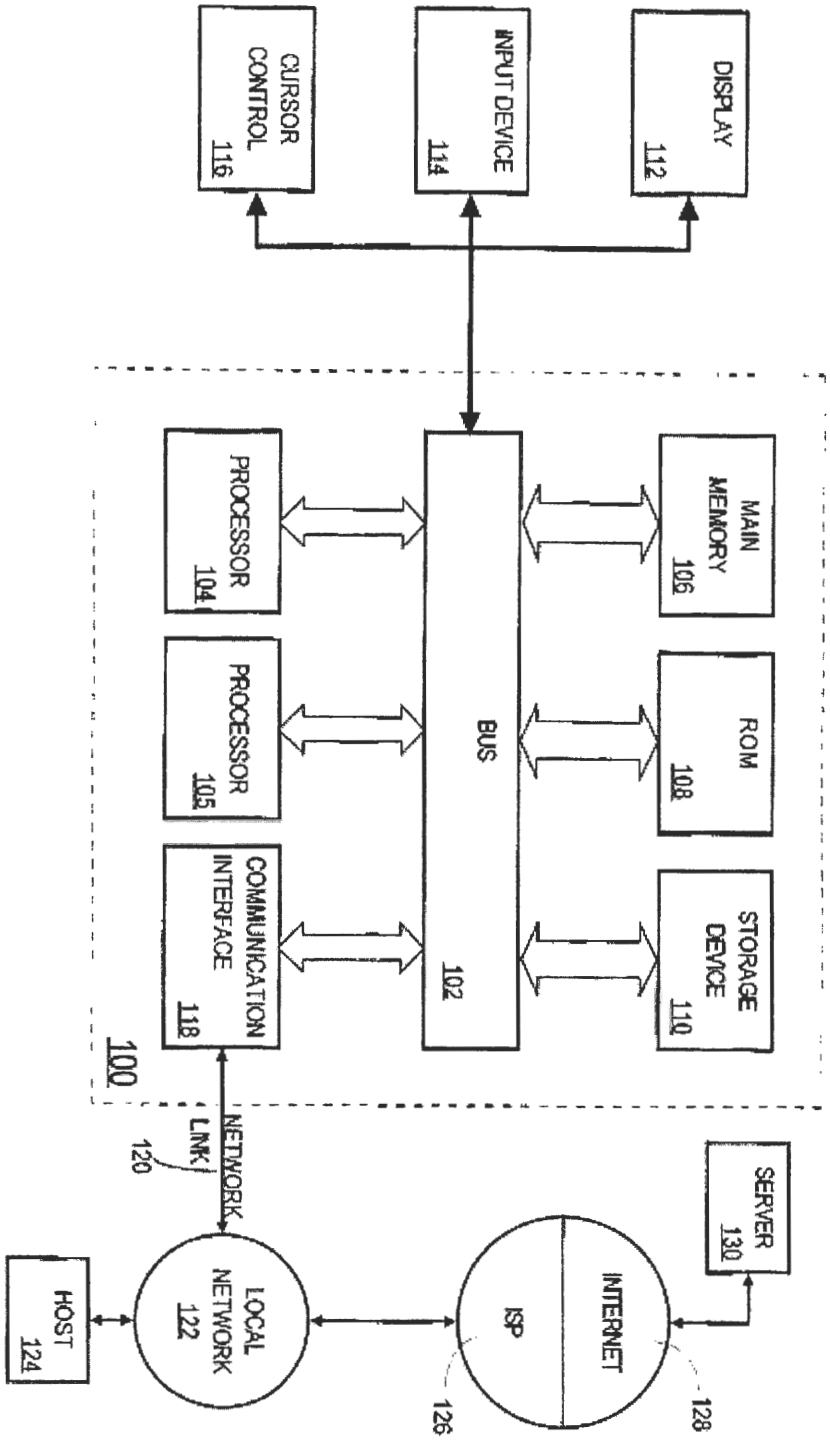
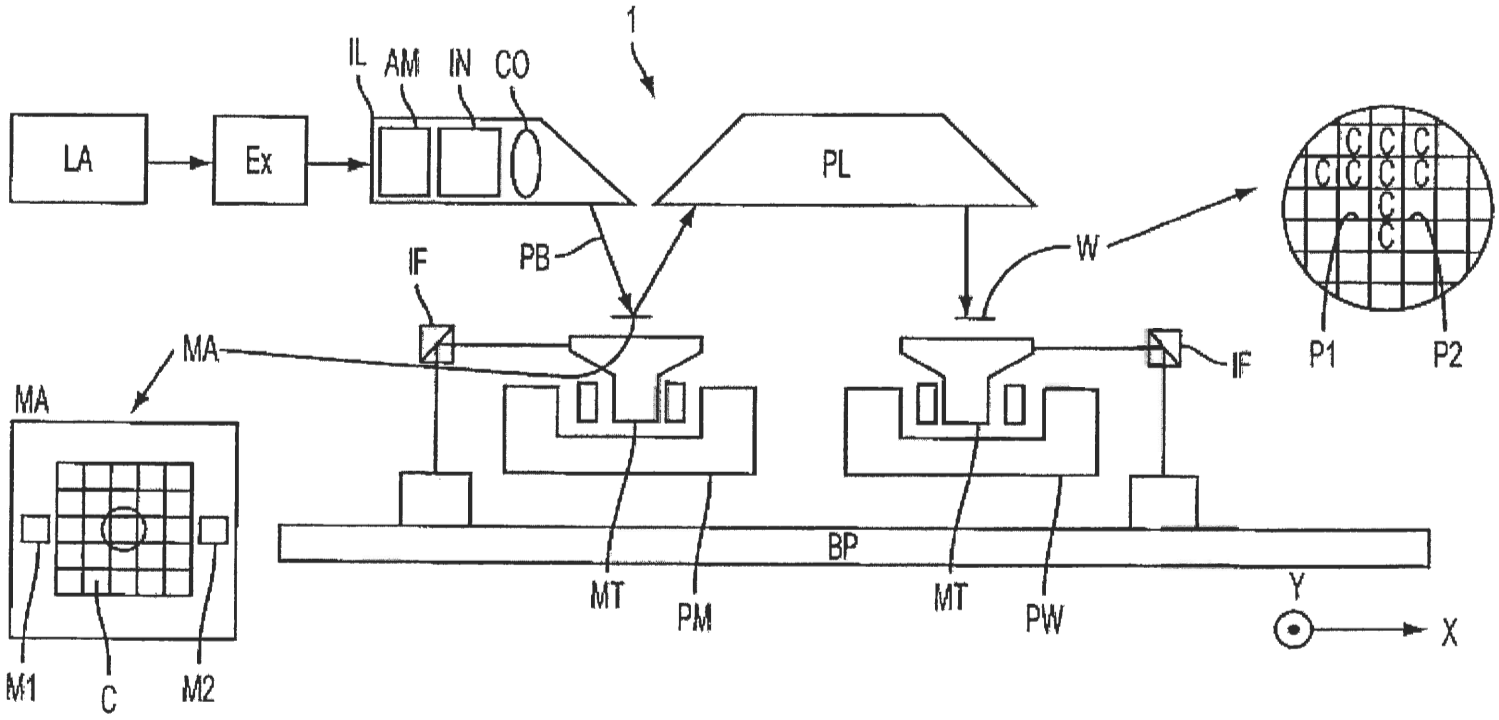

DISPLAY
112
INPUT DEVICE
114
CURSOR CONTROL
116
MAIN MEMORY
106
ROM
108
STORAGE DEVICE
110
BUS
102
PROCESSOR
104
PROCESSOR
105
COMMUNICATION INTERFACE
118
100
LINK
120
NETWORK
LOCAL NETWORK
122
HOST
124
ISP
126
INTERNET
128
SERVER
130

FIG. 16

FIG. 17



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