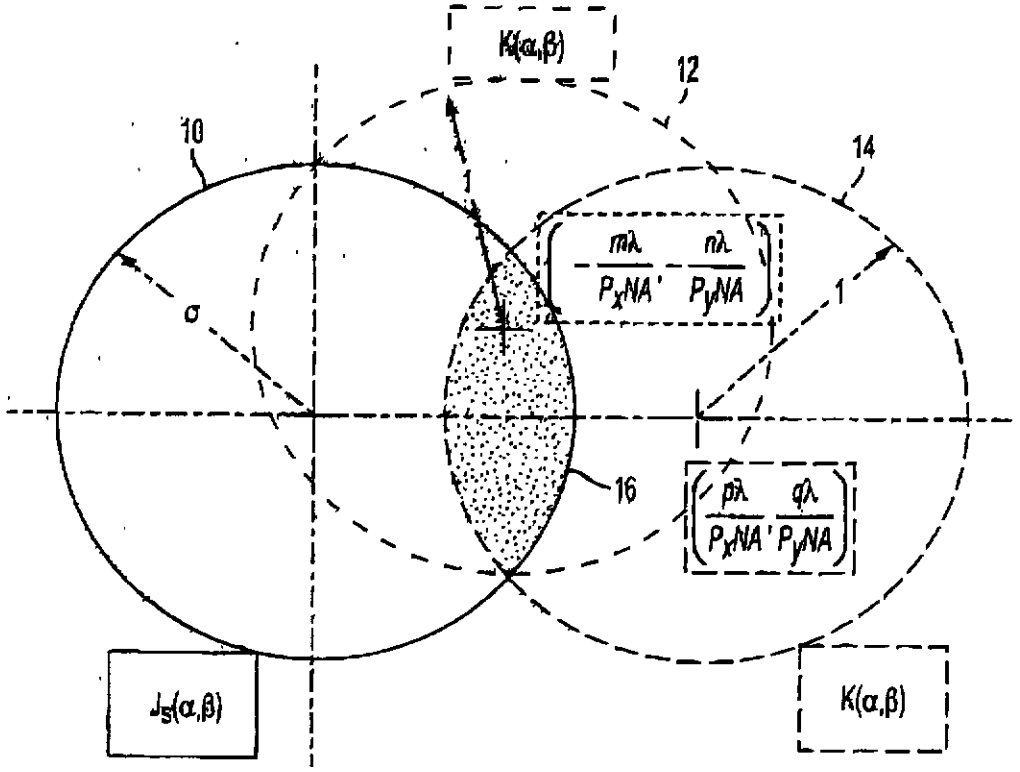


FIG. 1

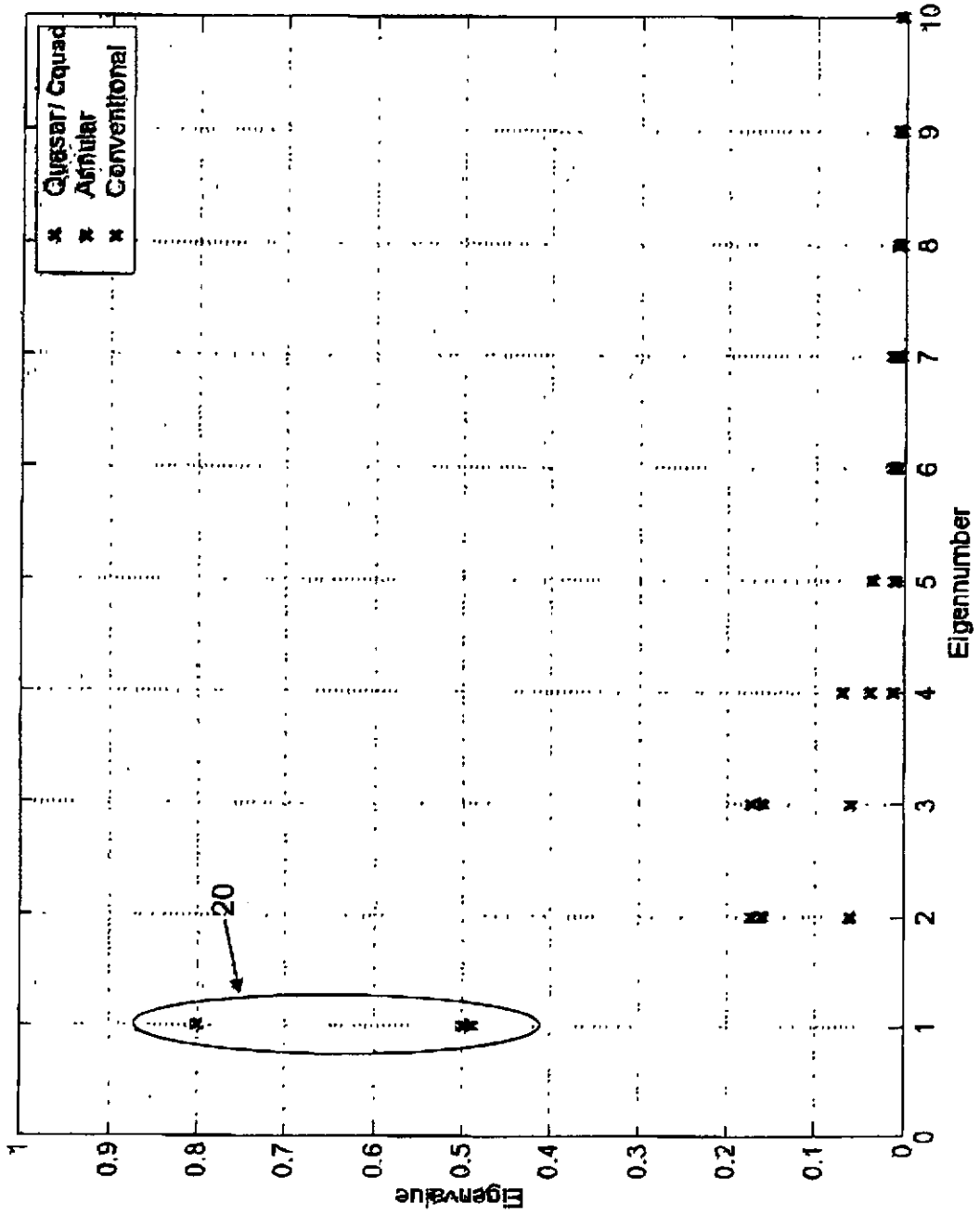

Quasar/ Cquad
Annular
Conventional
20
Eigenvalue
Eigennumber
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
1
2
3
4
5
6
7
8
9
10

Fig. 2

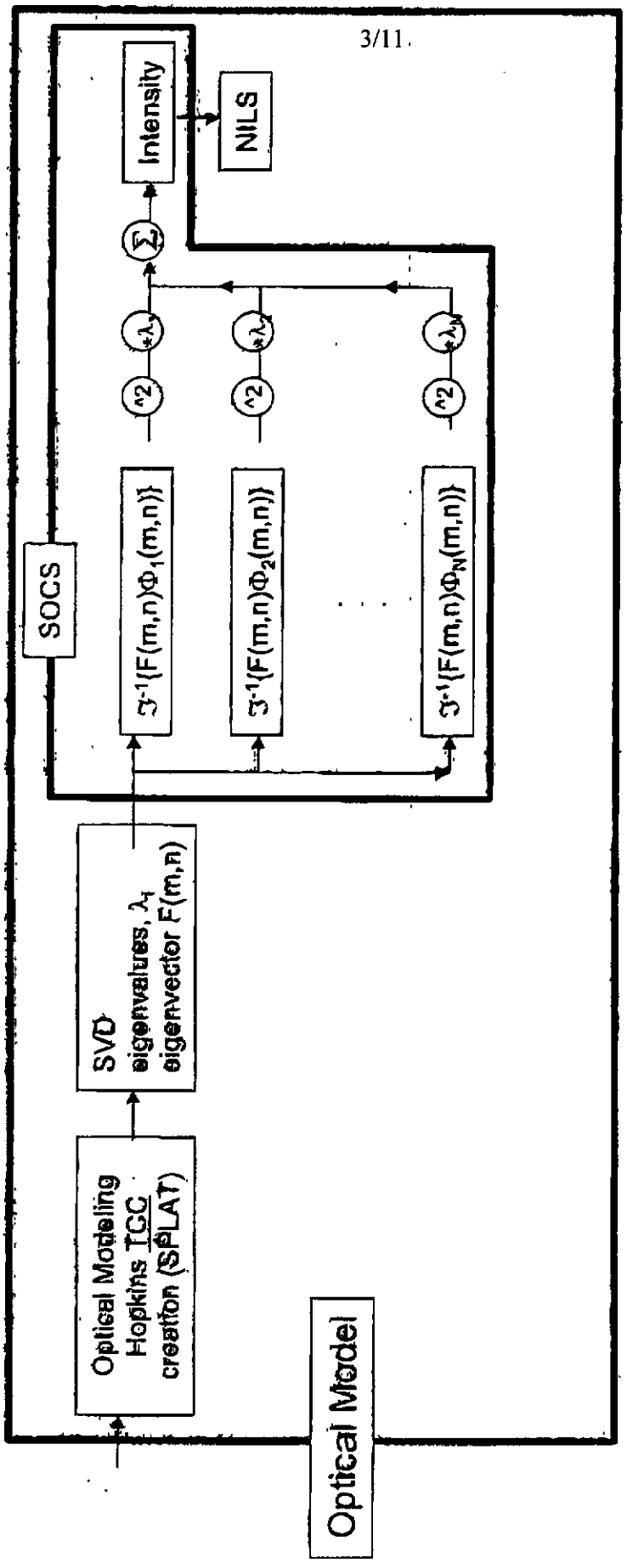

Optical Model
Optical Modeling
Hopkins TCC
creation (SPLAT)
SVD
eigenvalues, λ_i
eigenvector $F(m,n)$
SOCS
$\mathfrak{I}^{-1}\{F(m,n)\Phi_1(m,n)\}$
$\mathfrak{I}^{-1}\{F(m,n)\Phi_2(m,n)\}$
$\mathfrak{I}^{-1}\{F(m,n)\Phi_N(m,n)\}$
^2
$*\lambda_i$
Σ
Intensity
NILS

Fig. 3

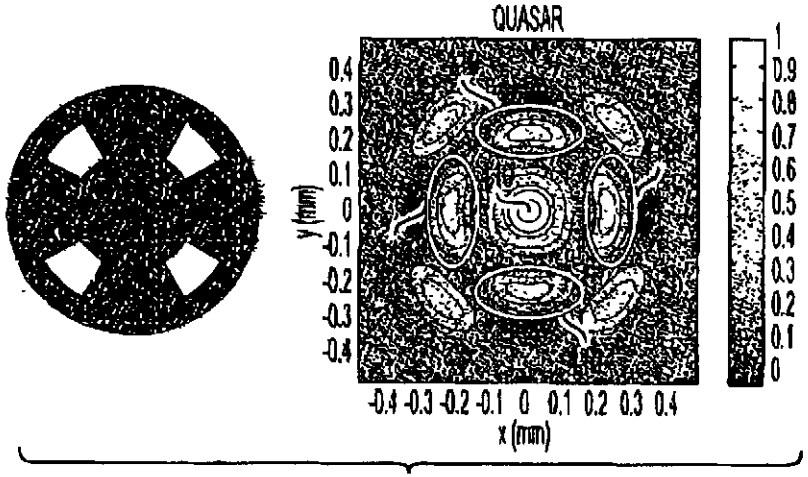


FIG. 4A

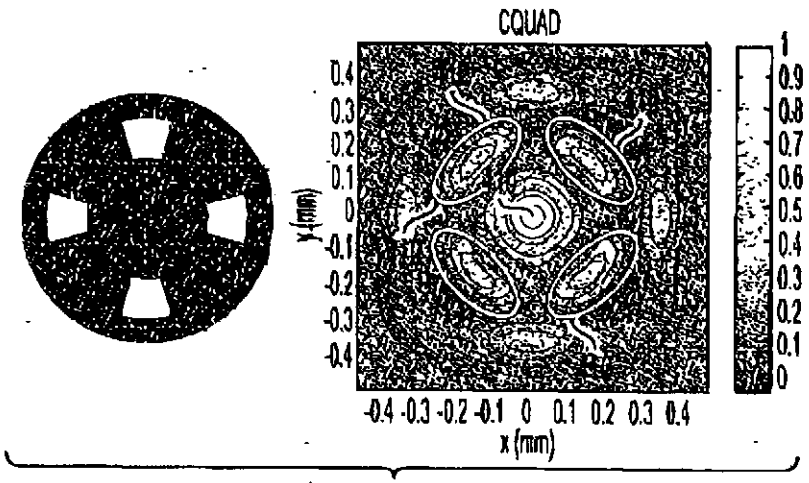


FIG. 4B

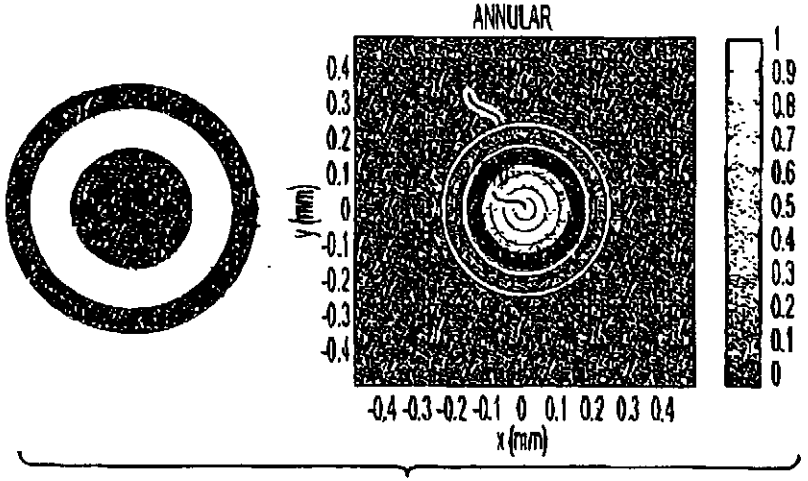


FIG. 4C

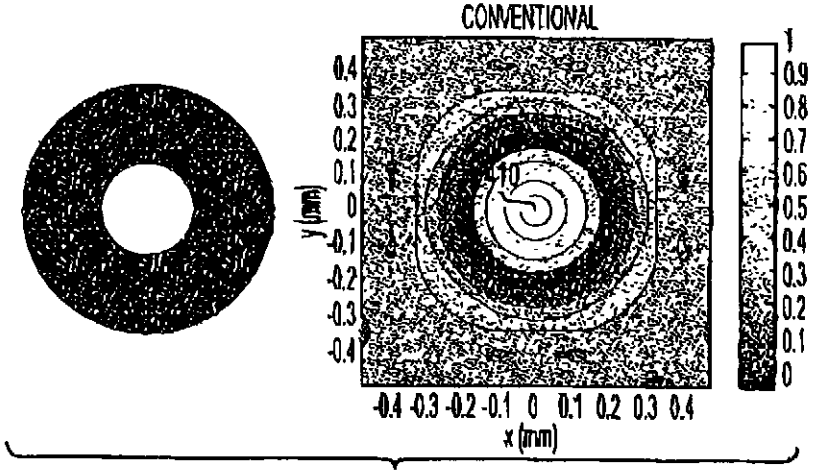


FIG. 4D

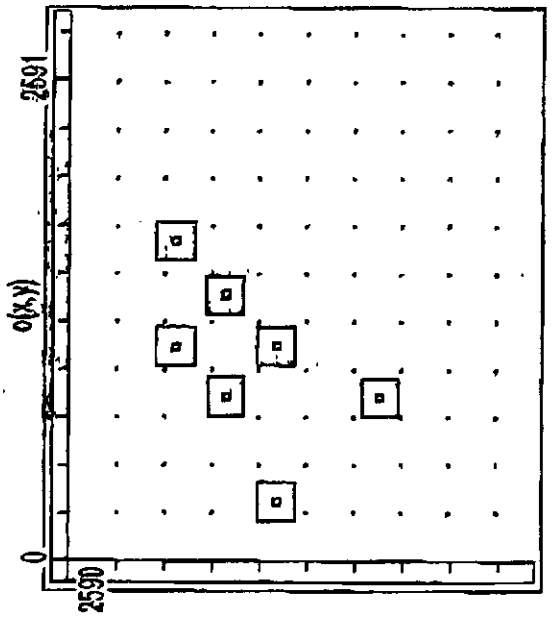


FIG. 5

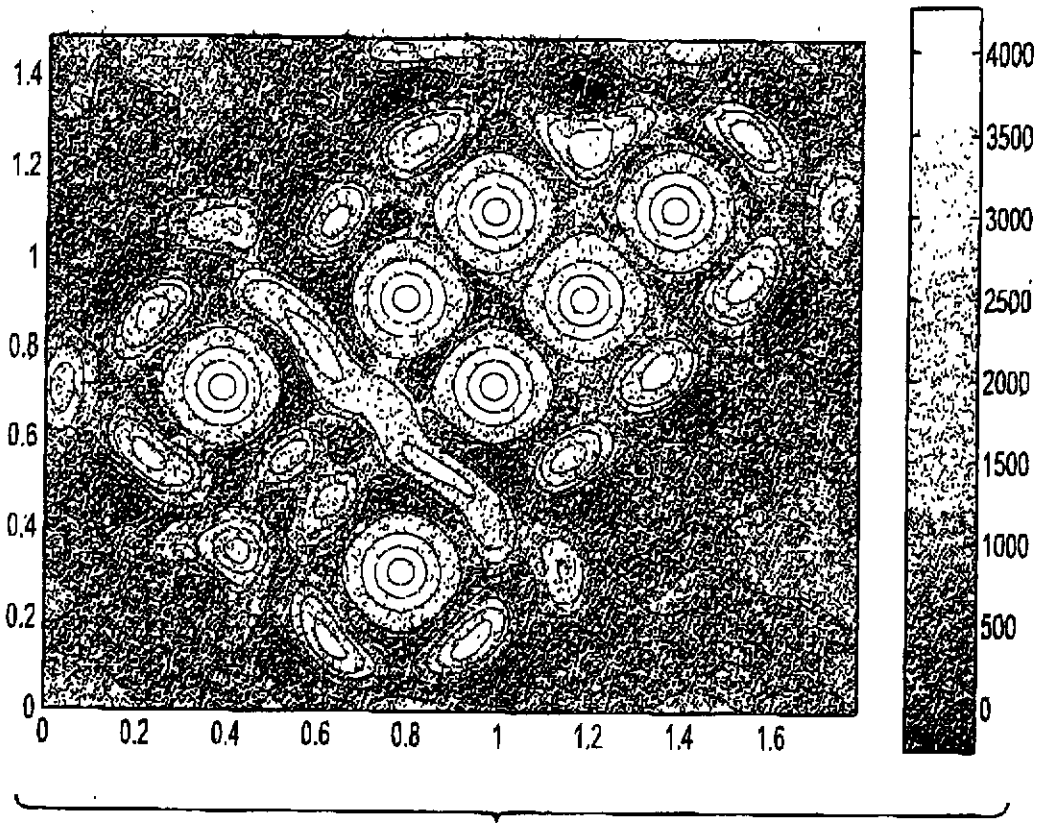

1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
4000
3500
3000
2500
2000
1500
1000
500
0

FIG. 6

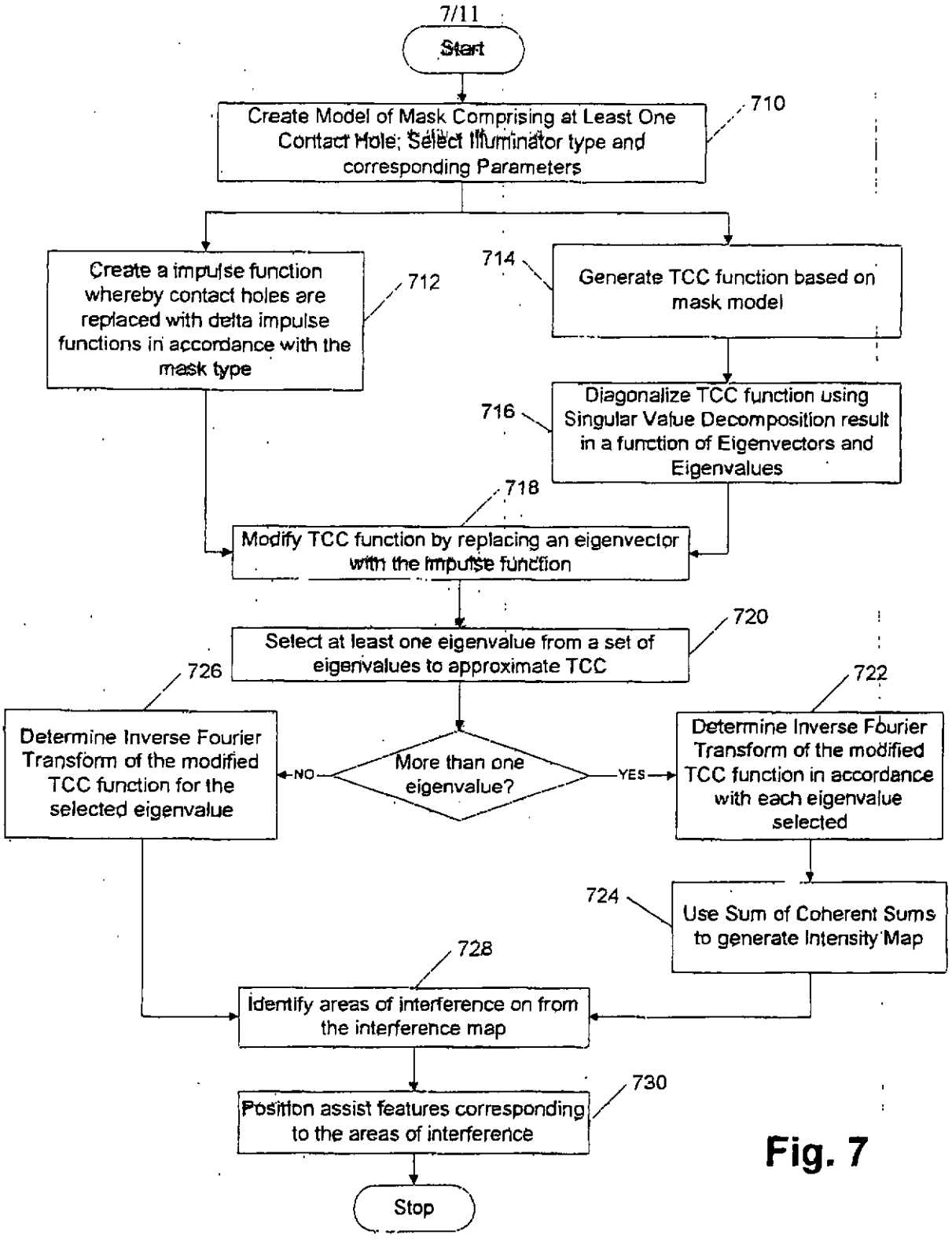

Start
Create Model of Mask Comprising at Least One Contact Hole; Select Illuminator type and corresponding Parameters
710
Create a impulse function whereby contact holes are replaced with delta impulse functions in accordance with the mask type
712
714
Generate TCC function based on mask model
716
Diagonalize TCC function using Singular Value Decomposition result in a function of Eigenvectors and Eigenvalues
718
Modify TCC function by replacing an eigenvector with the impulse function
720
Select at least one eigenvalue from a set of eigenvalues to approximate TCC
726
Determine Inverse Fourier Transform of the modified TCC function for the selected eigenvalue
NO
More than one eigenvalue?
YES
722
Determine Inverse Fourier Transform of the modified TCC function in accordance with each eigenvalue selected
724
Use Sum of Coherent Sums to generate Intensity Map
728
Identify areas of interference on from the interference map
730
Position assist features corresponding to the areas of interference
Stop

Fig. 7

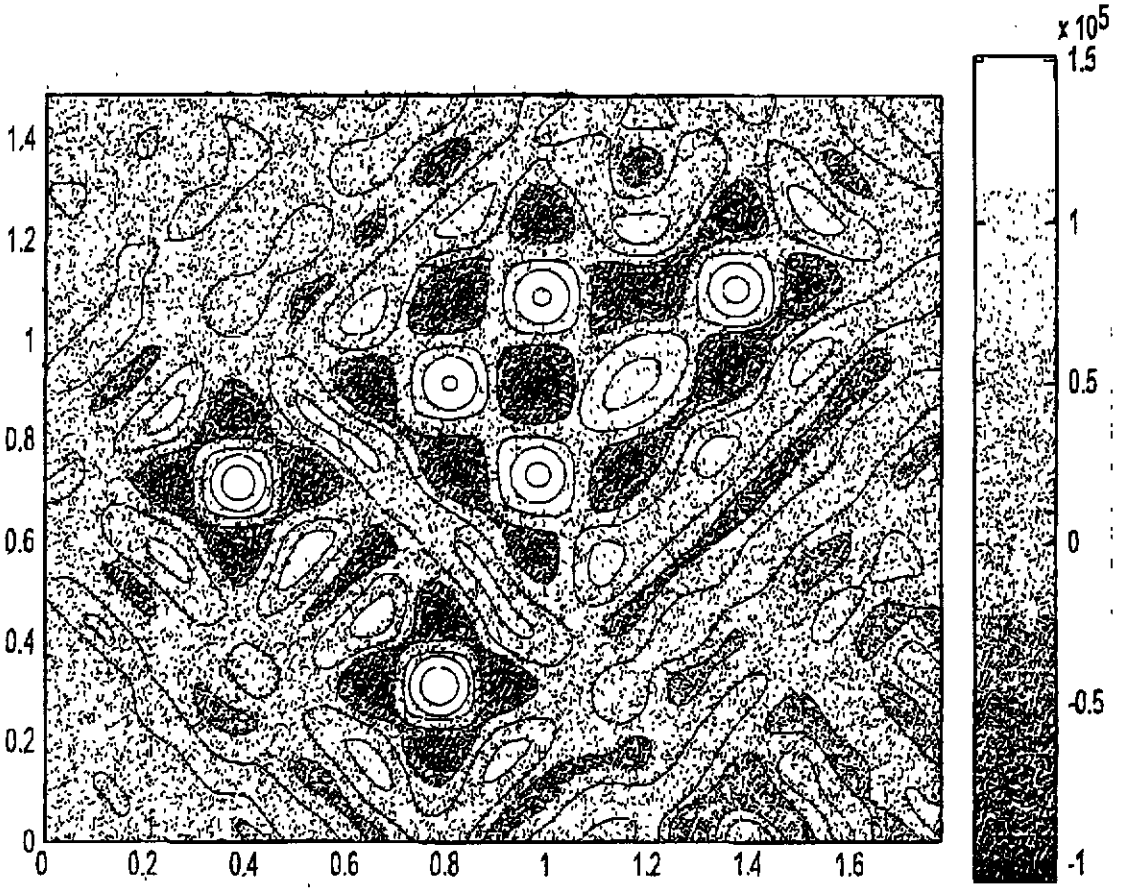


FIG. 8

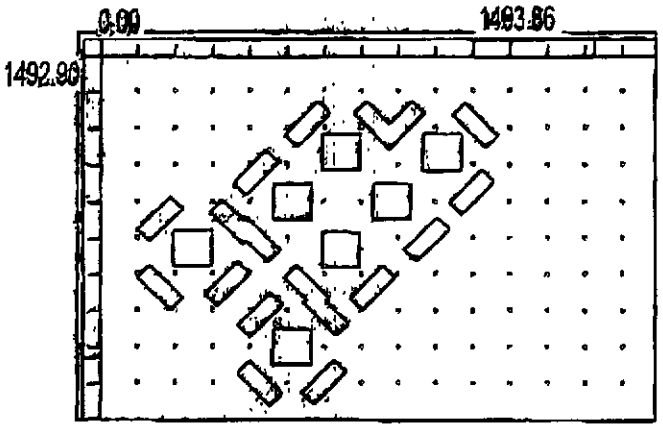


FIG. 9

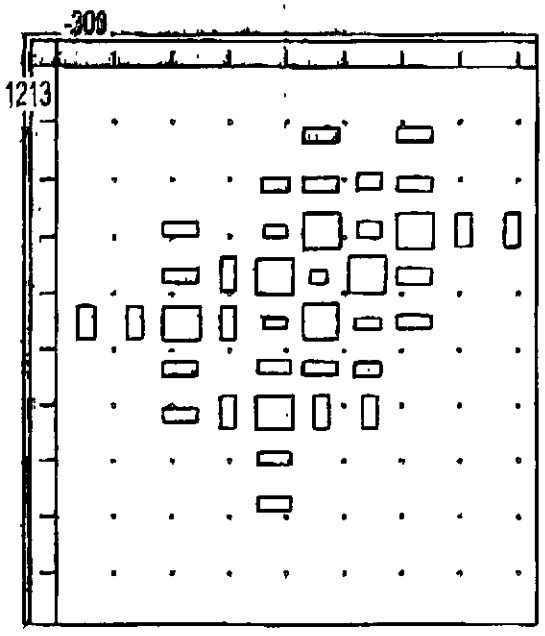


FIG. 12

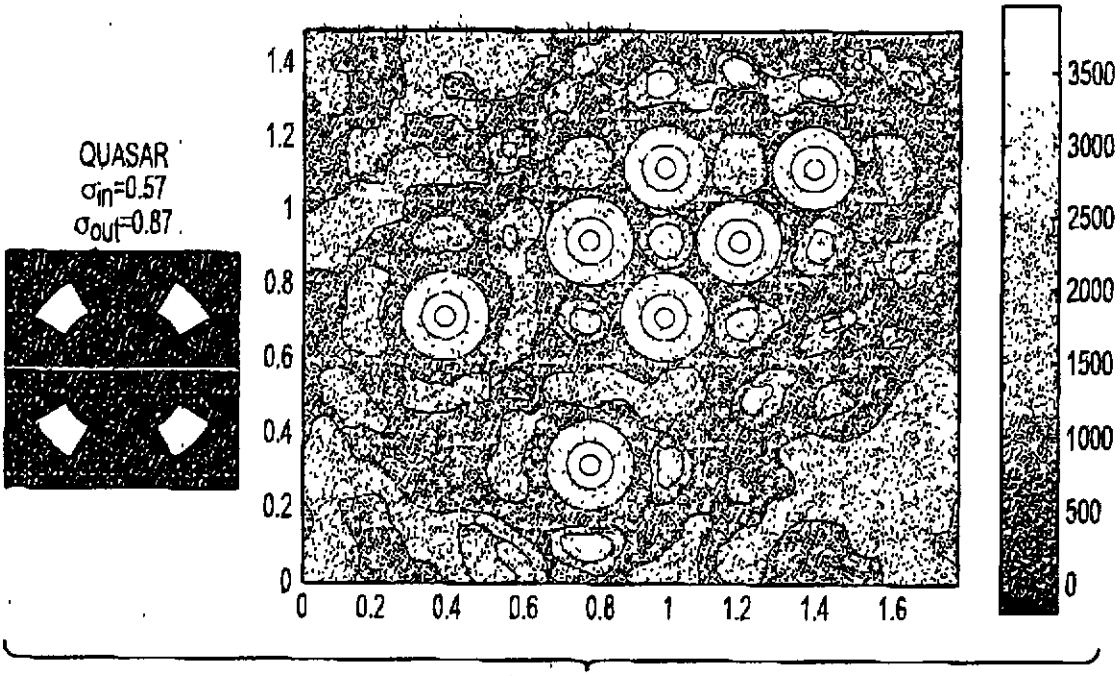

QUASAR
σin=0.57
σout=0.87
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6
3500
3000
2500
2000
1500
1000
500
0

FIG. 10

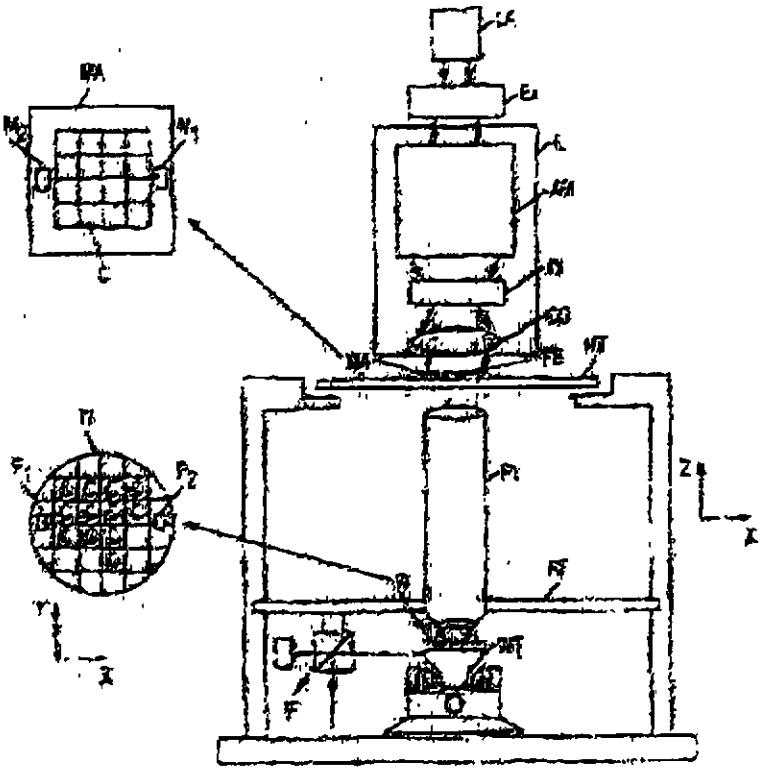


Figure 11