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"""
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"""

from pylab import *

import numpy as np
import matplotlib.pyplot as plt


#create disk (radius r) filled with 1s, surrounded by 0s (over area x,
def source2d(x,y,r):
    res = np.zeros(dtype=complex,shape=(x,y))
    y,x = np.ogrid[-x/2: x/2, -y/2: y/2]
    mask = (x)**2+(y)**2 <= r**2
    res[mask]=1
    return res


#create disk (radius r) filled with 1s, and spots with 2s, surrounded
def randsource2d(x,y,r):
    res = np.zeros(dtype=complex,shape=(x,y))
    y,x = np.ogrid[-x/2: x/2, -y/2: y/2]
    mask1 = (x)**2+(y)**2 <= r**2
    mask2 = (x-5)**2+(y+15)**2 <= (r-45)**2
    mask3 = (x+10)**2+(y-20)**2 <= (r-40)**2
    mask4 = (x-30)**2+(y+10)**2 <= (r-40)**2
    #res[mask]=np.round(np.random.rand(sum(mask))*2)
    res[mask1]=1
    res[mask2]=2
    res[mask3]=2
    res[mask4]=2
    return res
```

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x,y = 512, 512

delx=10**-2
N=x
delk=2*pi/(N*delx)

#wrapper for fftshift(fft2(fftshift(var))) to make editing easier
def fwrp2(var):
    return fftshift(fft2(fftshift(var)))*(delx)**2

def ifwrp2(var):
    return ifftshift(ifft2(ifftshift(var)))/(delx)**2

#disks (in fourierspace)
det1=source2d(x,y,50)
det2 = det1


#disk made up of 1s with spots of 2s, surrounded by 0s in position spa
sources=randsource2d(x,y,50)

#source * inverse fourier of the detectors
sdets=sources*ifwrp2(det1)*ifwrp2(det2)

# fourier of the product to get the result
results=fwrp2(sdets)

G2s=abs(results)**2


# new figure
fig, ((ax1, ax2), (ax3, ax4)) = plt.subplots(2,2)
#plot source
im1 = ax1.imshow(sources.real)
#plot |visibility|^2
im2 = ax2.imshow(G2s)
#plot real-part of result
im3 = ax3.imshow(results.real)
#plot imaginary part of result
im4 = ax4.imshow(results.imag)

plt.tight_layout()

plt.show()
```