In [8]:
```
import ehtim as eh # installed using https://github.com/achael/eht-imaging
import ehtplot.color # installed using https://github.com/liamedeiros/ehtplot (only
import matplotlib.pyplot as plt
import numpy as np
```

Input Parameters

In [9]:
```
input_filename = 'data/img64_mad_a0.94_i30_variable_pa1_noscattering.npy'
output_filename = 'data/test.fits'

flux = 1            # total flux of the image in Janskys (Jy). M87 has a flux of ar
object_name = 'M87' # the source you are observing

# the right ascension (ra) in fractional hours and source declination (dec) in frac
if object_name == "M87":
    ra = 12.513728717168174
    dec = 12.39112323919932
elif object_name == "SgrA":
    ra = 17.761121055553343
    dec = -29.00784305556

# the field of view of the image in radians.
# This depends on the image you use In this tutorial, ...
if object_name == 'M87':
    fov = 128.0 * eh.RADPERUAS  # chosen to ring that is 40 uas for the example 64x
elif object_name == 'SgrA':
    fov = 160.0 * eh.RADPERUAS  # chosen to ring that is 50 uas for the example 64x
```

Load the image data

In [10]:
```
# get the image data from the numpy array. you could also load data in a different
data = np.load(input_filename)
image = data[0]

# get the size of the image (assuming a square image here)
image_size = image.shape[0]
```

Create image object

In [11]:
```
# normalize the image so it matches the desired total flux. each pixel has units Jy
image = (image/np.sum(image) ) * flux

# create the image object
im = eh.image.Image(image, psize=fov / float(image_size), ra=ra, dec=dec, source=ob
```

some useful properties of the image object:

im.source : name of source you are observing

im. ra / im.dec : the right-ascension and declanation of the source you are observing

im.imvec: to access the vectorized image

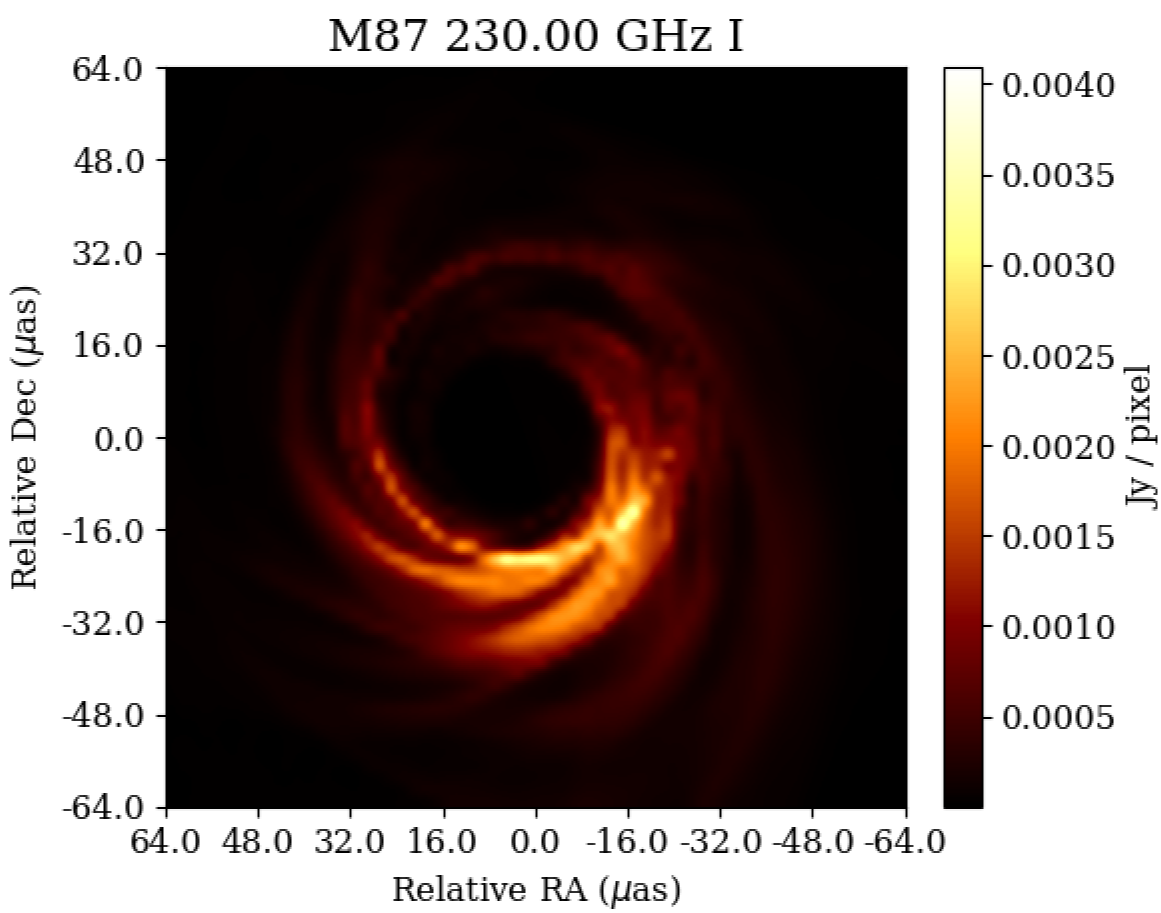
im.xdim / im.ydim: the number of pixels in the x/y direction

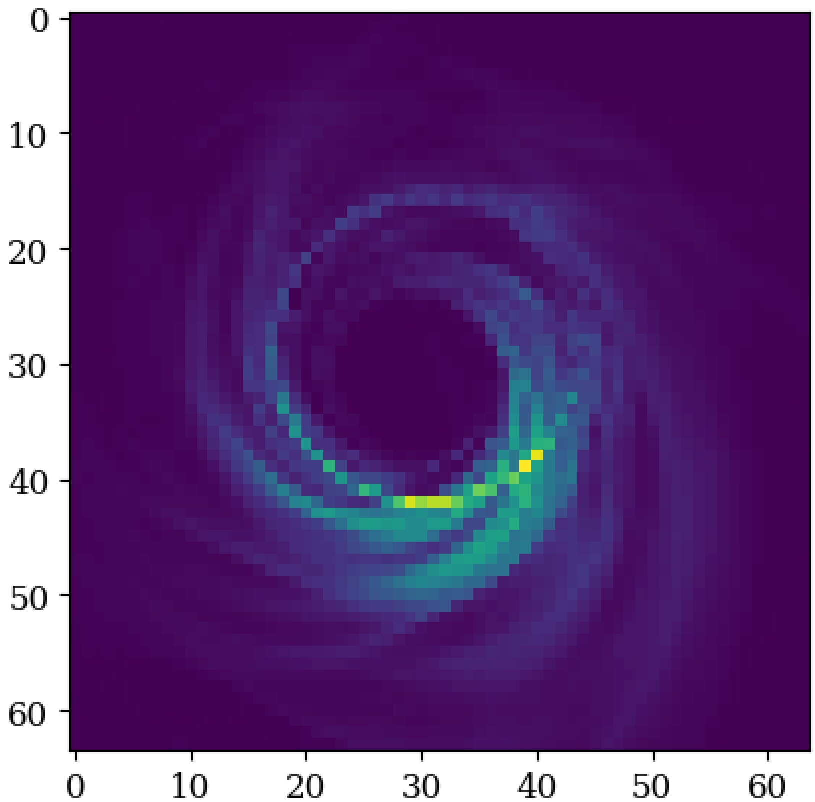
im.psize : the pixel size in radians

im.fovx() / im.fovy() : the field of view in radians

In [12]:
```
# print the field of view (fov) in micro-arcseconds
print('field of view:')
print(im.psize*im.xdim / eh.RADPERUAS)
print(im.fovx() / eh.RADPERUAS)

# display the image
im.display() #use the argument cfun="afmhot_10us" to use the same colormap as in th

#display the image by plotting what is in im.imvec. it will appear flipped
plt.imshow(np.reshape(im.imvec, (im.ydim,im.xdim)))

# make a copy of the image object
im2 = im.copy()
```

```
field of view:
128.0
128.0
```





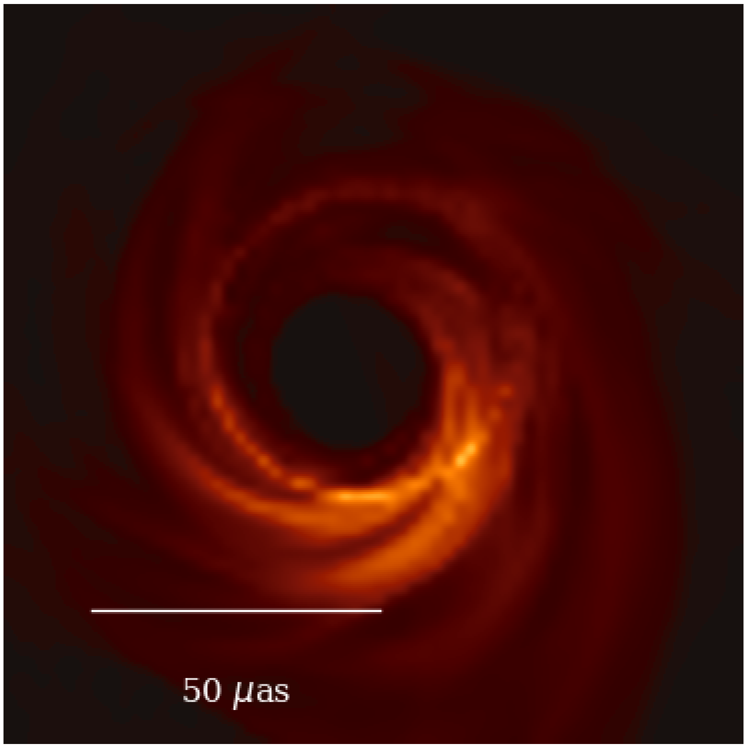
Save eht image to fits file

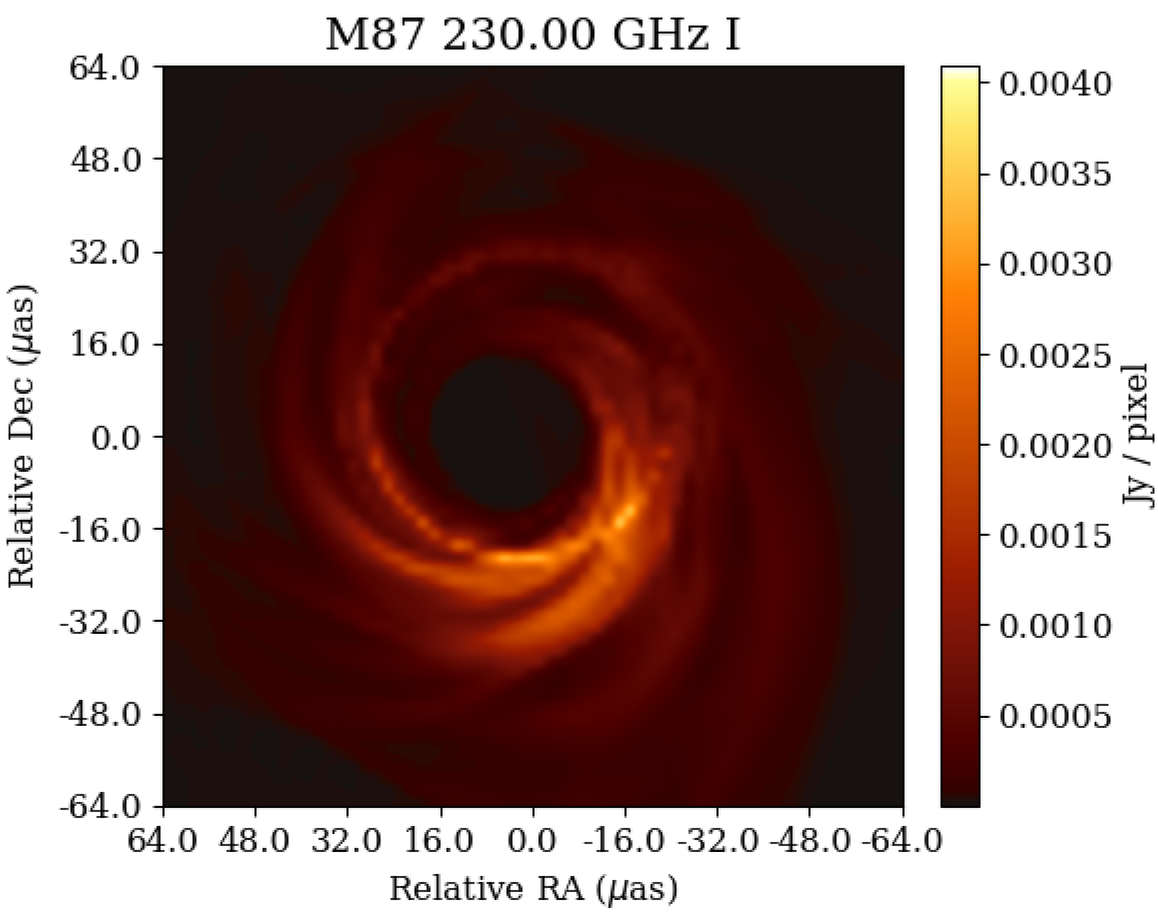
In [13]:
```
im.save_fits(output_filename)
```

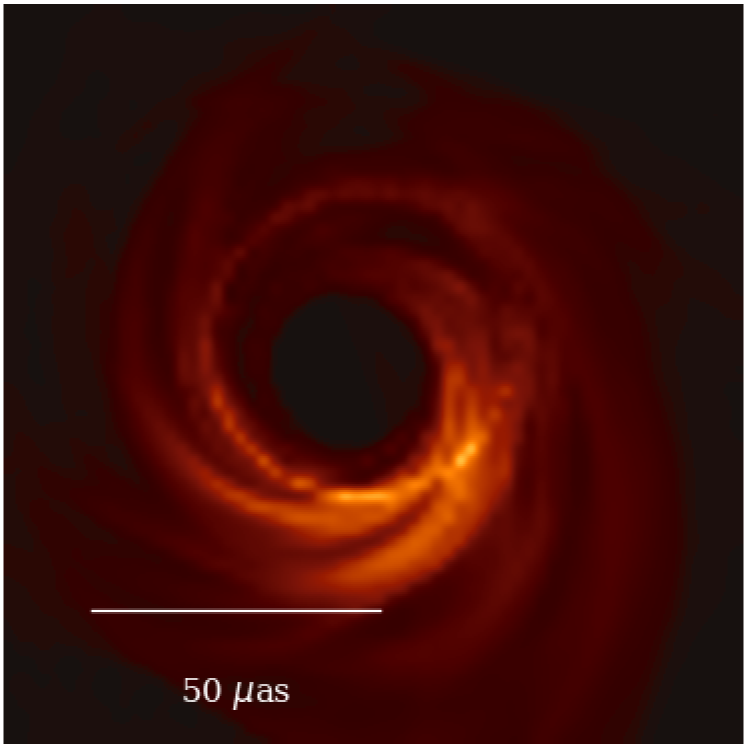
Save pdfs of the image displyed in different ways

In [14]:
```
im.display(export_pdf = "test_image_1.png", show=False, cfun="afmhot_10us") # to ou
im.display(export_pdf = "test_image_2.png", show=False, cfun="afmhot_10us", label_t
```

Out[14]:


50 μas


M87 230.00 GHz I
64.0
48.0
32.0
16.0
0.0
-16.0
-32.0
-48.0
-64.0
Relative Dec (μas)
64.0 48.0 32.0 16.0 0.0 -16.0 -32.0 -48.0 -64.0
Relative RA (μas)
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
Jy / pixel


50 μas