plot_footprints

May 11, 2021

[1]:
```
import healpy as hp
from pixell import enmap, utils, powspec, enplot, reproject #, pointsrcs
#import rotfuncs
from astropy.io import fits   # for saving/reeading maps
from astropy.table import Table
import matplotlib.pyplot as plt
import numpy as np
```

1 Read public ACT footprint

[2]:
```
# Read ACT mask
path = './input/act_dr5/public_act_dr5_mask_full_foot_gal60_ps.fits'
actMask = enmap.read_map(path)
if len(actMask.shape)>2:
        actMask = actMask[0]
```

[3]:
```
lMax = 1000
nSide = 2048
actMask = reproject.healpix_from_enmap(actMask, lMax, nSide)
```

```
Sigma is 0.000000 arcmin (0.000000 rad)
-> fwhm is 0.000000 arcmin
```

[4]:
```
# Mask the mask for plotting ;)
actMaskPlot = hp.ma(actMask)
actMaskPlot.mask = actMask<0.5#np.logical_not(actMask)
```

2 Read DESI 14k footprint, and 10k footprint from Eddie (May 10 2021)

[5]:
```
# Read DESI footprint
path = './input/desi_10k/footprint_desi_10k_schlafly_20210510.ecsv'
table = Table.read(path, format='ascii.ecsv')
# Keep the tiles as Eddie Schalfly does:
```

```
#The 10k footprint has IN_DESI = True and PRIORITY_BOOSTFAC = 1.  The remaining␣
 ↪4k deg^2 has PRIORITY_BOOSTFAC < 1.
I = table['IN_DESI'] * (table['PRIORITY_BOOSTFAC']==1)
table10k = table[I]
J = table['IN_DESI'] * (table['PRIORITY_BOOSTFAC']<=1)
table14k = table[J]
```

3 Read HSC footprint

[8]:
```
hscS20A = hp.read_map('./input/hsc_s20a/s20a_fdfc_hp_contarea_izy-gt-5.fits')
```

```
NSIDE = 1024
ORDERING = NESTED in fits file
INDXSCHM = IMPLICIT
Ordering converted to RING
```

[9]:
```
# Mask the mask for plotting ;)
hscS20APlot = hp.ma(hscS20A)
hscS20APlot.mask = hscS20A<0.5#np.logical_not(actMask)
```

4 Read KiDS1000 footprint

[10]:
```
kids1000 = hp.read_map('./input/kids_1000/KiDS_K1000_healpix.fits')
```

```
NSIDE = 4096
ORDERING = RING in fits file
INDXSCHM = IMPLICIT
```

[11]:
```
# Mask the mask for plotting ;)
kids1000Plot = hp.ma(kids1000)
kids1000Plot.mask = kids1000<0.5#np.logical_not(actMask)
```

5 Read DES Y3 footprint?

[12]:
```
# desY3 = hp.read_map('./input/des_y3/y3a2_footprint_griz_1exp_v1.0.fits.gz')
```

[13]:
```
# # Mask the mask for plotting ;)
# desY3Plot = hp.ma(desY3)
# desY3Plot.mask = desY3<0.5#np.logical_not(actMask)
```

6 Overlap ACT (green), DESI 10k (red), DESI 14k (magenta)

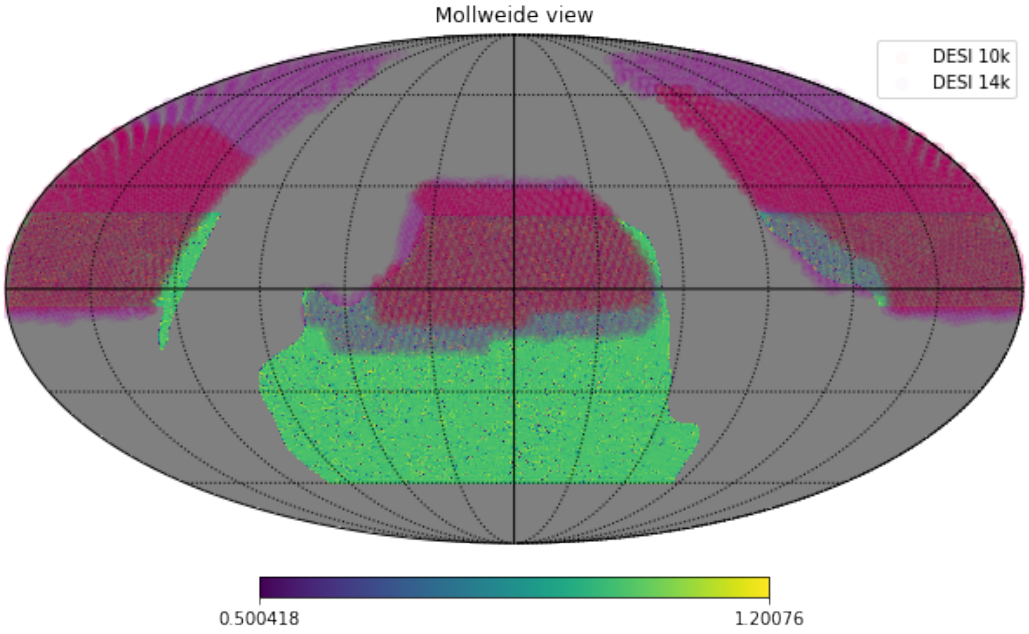
[14]:
```
fig=plt.figure(0)
#
hp.mollview(actMaskPlot)
#
hp.projscatter(table10k['RA'], table10k['DEC'], lonlat=True, coord='E', c='r',␣
↪alpha=0.02, label=r'DESI 10k')
hp.projscatter(table14k['RA'], table14k['DEC'], lonlat=True, coord='E', c='m',␣
↪alpha=0.02, label=r'DESI 14k')
#
hp.graticule()

plt.legend(loc=1)

plt.show()
```

```
0.0 180.0 -180.0 180.0
The interval between parallels is 30 deg -0.00'.
The interval between meridians is 30 deg -0.00'.
```

```
<Figure size 432x288 with 0 Axes>
```



7 Overlap HSC (blue), DESI 10k (red), DESI 14k (magenta)

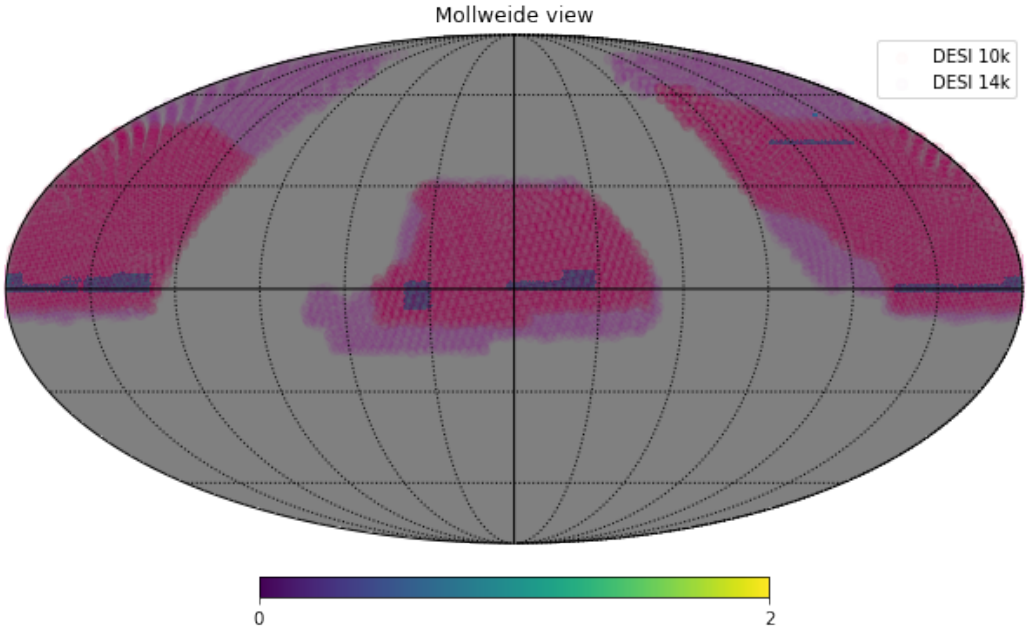
[15]:
```
fig=plt.figure(0)
#
hp.mollview(hscS20APlot)
#
hp.projscatter(table10k['RA'], table10k['DEC'], lonlat=True, coord='E', c='r',␣
 ↪alpha=0.01, label=r'DESI 10k')
hp.projscatter(table14k['RA'], table14k['DEC'], lonlat=True, coord='E', c='m',␣
 ↪alpha=0.01, label=r'DESI 14k')
#
hp.graticule()

plt.legend(loc=1)

plt.show()
```

```
0.0 180.0 -180.0 180.0
The interval between parallels is 30 deg -0.00'.
The interval between meridians is 30 deg -0.00'.
```

```
<Figure size 432x288 with 0 Axes>
```



8 Overlap KiDS1000 (blue), DESI 10k (red), DESI 14k (magenta)

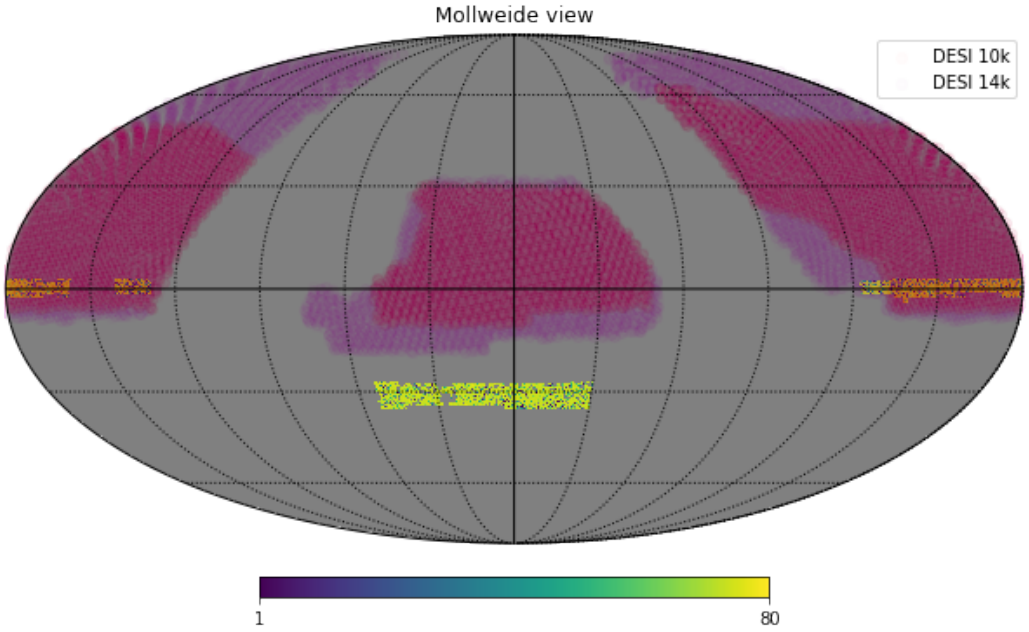
[16]:
```
fig=plt.figure(0)
#
hp.mollview(kids1000Plot)
#
hp.projscatter(table10k['RA'], table10k['DEC'], lonlat=True, coord='E', c='r',␣
↪alpha=0.01, label=r'DESI 10k')
hp.projscatter(table14k['RA'], table14k['DEC'], lonlat=True, coord='E', c='m',␣
↪alpha=0.01, label=r'DESI 14k')
#
hp.graticule()

plt.legend(loc=1)

plt.show()
```

```
0.0 180.0 -180.0 180.0
The interval between parallels is 30 deg -0.00'.
The interval between meridians is 30 deg -0.00'.
```

```
<Figure size 432x288 with 0 Axes>
```



[ ]: