

NN_WISE_maps_1016

November 18, 2016

```
In [1]: %matplotlib inline
        from astropy.table import Table
        from astropy.io import fits as pf
        import pylab as p
        import matplotlib.pyplot as plt
        import numpy as np
        import healpy as hp
        from matplotlib import cm
        cool_cmap = cm.hot_r
        cool_cmap.set_under('w')

In [2]: #change path according to the user
        path_to_folder = "/Users/abhi/py_workspace/Lrg_healpy/"
        a=hp.fitsfunc.read_map(path_to_folder+"wise_sys/wise_sys_map_p8.fits", field=0, hdu=1, h=False,
        b=hp.fitsfunc.read_map(path_to_folder+"wise_sys/wise_sys_map_p8.fits", field=1, hdu=1, h=False,
        c=hp.fitsfunc.read_map(path_to_folder+"wise_sys/wise_sys_map_p8.fits", field=2, hdu=1, h=False,

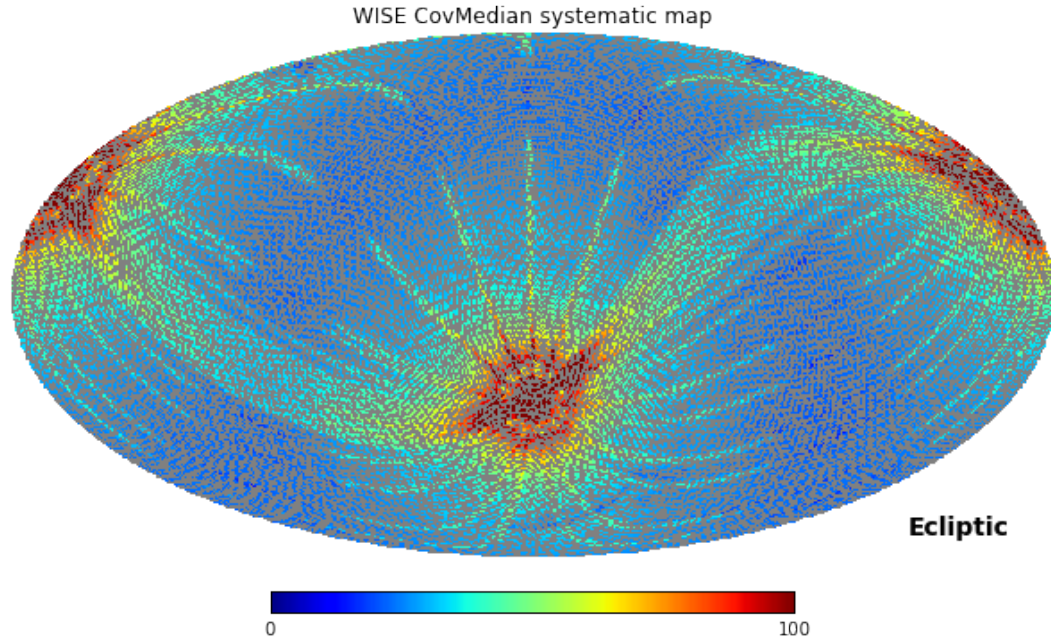
NSIDE = 64
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/Users/abhi/Library/Enthought/Canopy_64bit/User/lib/python2.7/site-packages/healpy/pixelfunc.py:270: RuntimeWarning:
  return np.absolute(m - badval) <= atol + rtol * np.absolute(badval)

In [3]: hp.mollview(a,coord=['G','E'],title="WISE CovMedian systematic map",max = 100,min =0)
        print min(a), max(a)

14.4482421875 172.859375

/Users/abhi/Library/Enthought/Canopy_64bit/User/lib/python2.7/site-packages/numpy/ma/core.py:2200: RuntimeWarning:
  condition = umath.less_equal(mabs(xnew - value), atol + rtol * mabs(value))
/Users/abhi/Library/Enthought/Canopy_64bit/User/lib/python2.7/site-packages/healpy/projaxes.py:998: RuntimeWarning:
  result.data[result.data<0]=0.0
/Users/abhi/Library/Enthought/Canopy_64bit/User/lib/python2.7/site-packages/healpy/projaxes.py:999: RuntimeWarning:
  result.data[result.data>1]=1.0
```



```
In [4]: NSIDE = 64
w1_covMed_map_nn = np.zeros(hp.nside2npix(NSIDE))
w1_Med_map_nn = np.zeros(hp.nside2npix(NSIDE))
w1_Moonlev_map_nn = np.zeros(hp.nside2npix(NSIDE))
gen_pix = np.arange(hp.nside2npix(NSIDE))
gen_theta, gen_phi = hp.pixelfunc.pix2ang(NSIDE, gen_pix, nest=False)

print len(a), len(np.zeros(hp.nside2npix(NSIDE)))

#hp.mollview(gen_pix, coord=['G', 'E'], title="WISE CovMedian systematic map", max = 50, min = 0)
print len(gen_theta), len(gen_phi)

for k, foo in enumerate(a):
    if np.isnan(a[k]) == True:
        j = hp.pixelfunc.get_all_neighbours(NSIDE, gen_theta[k], gen_phi[k], nest=False)
        tmp_a = a[j]
        tmp_b = b[j]
        tmp_c = c[j]
        w1_covMed_map_nn[k] = np.mean(tmp_a[~np.isnan(tmp_a)])
        w1_Med_map_nn[k] = np.mean(tmp_b[~np.isnan(tmp_b)])
        w1_Moonlev_map_nn[k] = np.mean(tmp_c[~np.isnan(tmp_c)])
    else :
        w1_covMed_map_nn[k] = a[k]
        w1_Med_map_nn[k] = b[k]
        w1_Moonlev_map_nn[k] = c[k]

print "done"
```

49152 49152

49152 49152
done

In [5]: *#Comparing Old maps with new ones.*

```
hp.mollview(w1_covMed_map_nn,coord=['G','E'],title="WISE CovMedian systematic map",max = 100,min=0,cbar=None)
hp.graticule(alpha=0.35)
fig = plt.gcf()
ax = plt.gca()
image = ax.get_images()[0]
cmap = fig.colorbar(image, ax=ax,orientation="horizontal",shrink=0.5,anchor=(0.5,2.90))

hp.mollview(a,coord=['G','E'],title="WISE CovMedian systematic map",max = 100,min =0,cbar=None)
hp.graticule(alpha=0.35)
fig = plt.gcf()
ax = plt.gca()
image = ax.get_images()[0]
cmap = fig.colorbar(image, ax=ax,orientation="horizontal",shrink=0.5,anchor=(0.5,2.90))

hp.mollview(w1_Med_map_nn,coord=['G','E'],title="WISE Median systematic map",max = 10,min =0,cbar=None)
hp.graticule(alpha=0.35)
fig = plt.gcf()
ax = plt.gca()
image = ax.get_images()[0]
cmap = fig.colorbar(image, ax=ax,orientation="horizontal",shrink=0.5,anchor=(0.5,2.90))

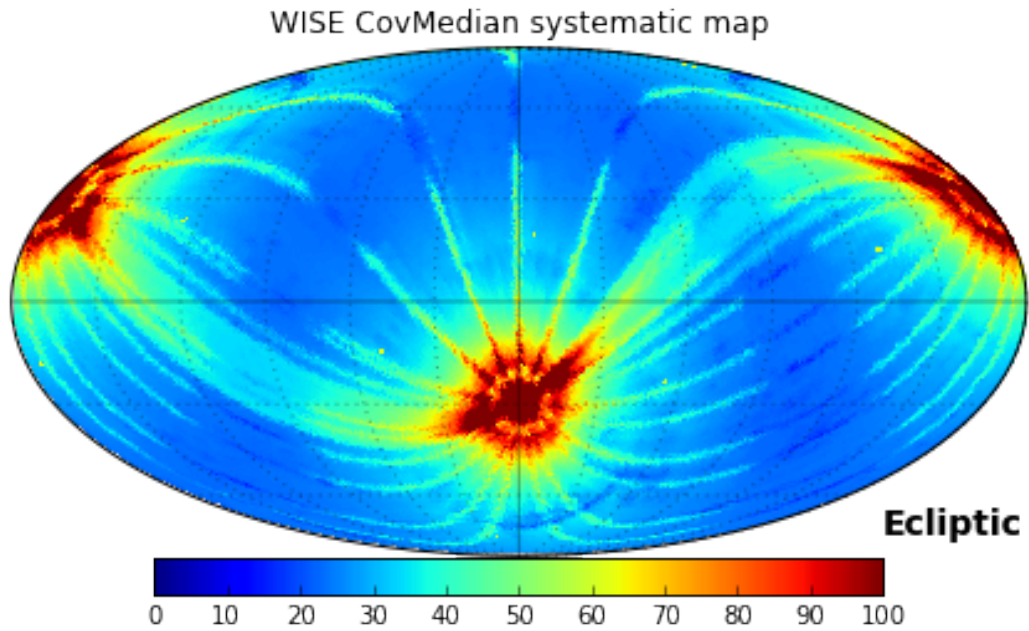
hp.mollview(b,coord=['G','E'],title="WISE Median systematic map",max = 10,min =0,cbar=None)
hp.graticule(alpha=0.35)
fig = plt.gcf()
ax = plt.gca()
image = ax.get_images()[0]
cmap = fig.colorbar(image, ax=ax,orientation="horizontal",shrink=0.5,anchor=(0.5,2.90))

hp.mollview(w1_Moonlev_map_nn,coord=['G','E'],title="WISE Moon Level systematic map",max = 2,min=-1,cbar=None)
hp.graticule(alpha=0.35)
fig = plt.gcf()
ax = plt.gca()
image = ax.get_images()[0]
cmap = fig.colorbar(image, ax=ax,orientation="horizontal",shrink=0.5,anchor=(0.5,2.90))

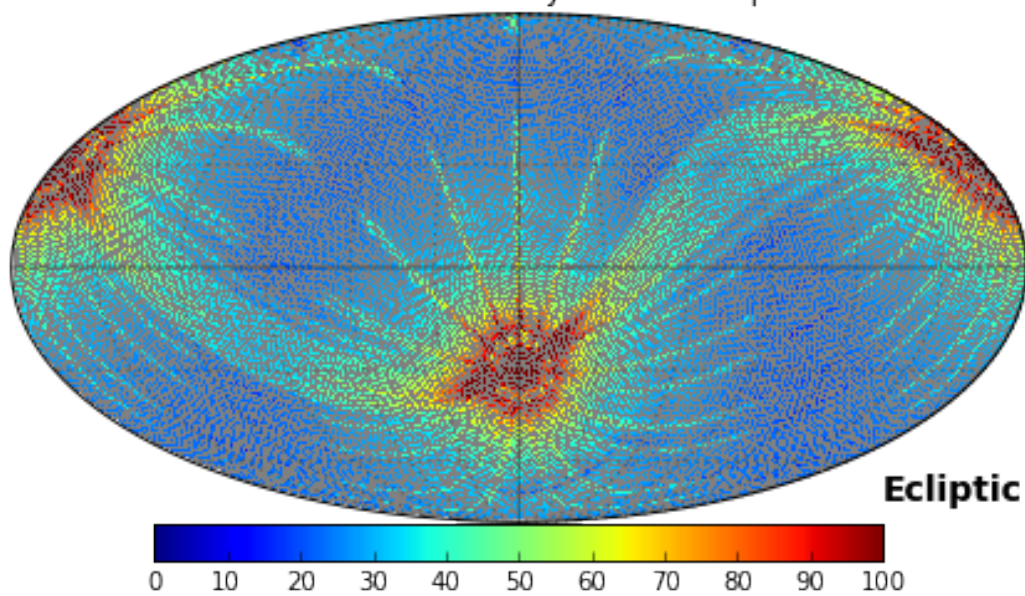
hp.mollview(c,coord=['G','E'],title="WISE Moon Level systematic map",max = 1,min =-1,cbar=None)
hp.graticule(alpha=0.35)
fig = plt.gcf()
ax = plt.gca()
image = ax.get_images()[0]
cmap = fig.colorbar(image, ax=ax,orientation="horizontal",shrink=0.5,anchor=(0.5,2.90))

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

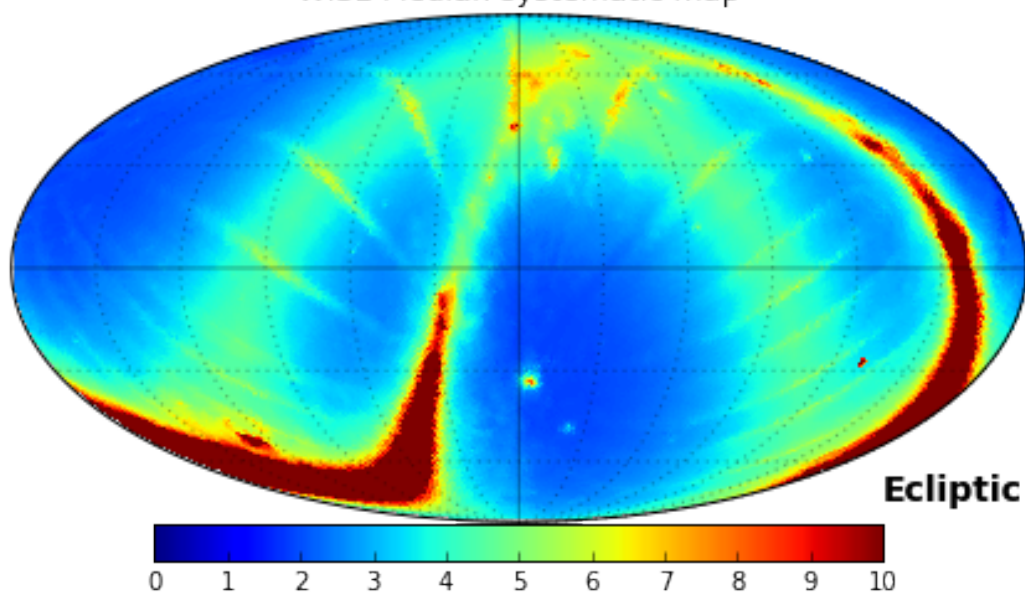
The interval between meridians is 30 deg -0.00'.
0.0 180.0 -180.0 180.0
The interval between parallels is 30 deg -0.00'.
The interval between meridians is 30 deg -0.00'.
0.0 180.0 -180.0 180.0
The interval between parallels is 30 deg -0.00'.
The interval between meridians is 30 deg -0.00'.
0.0 180.0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



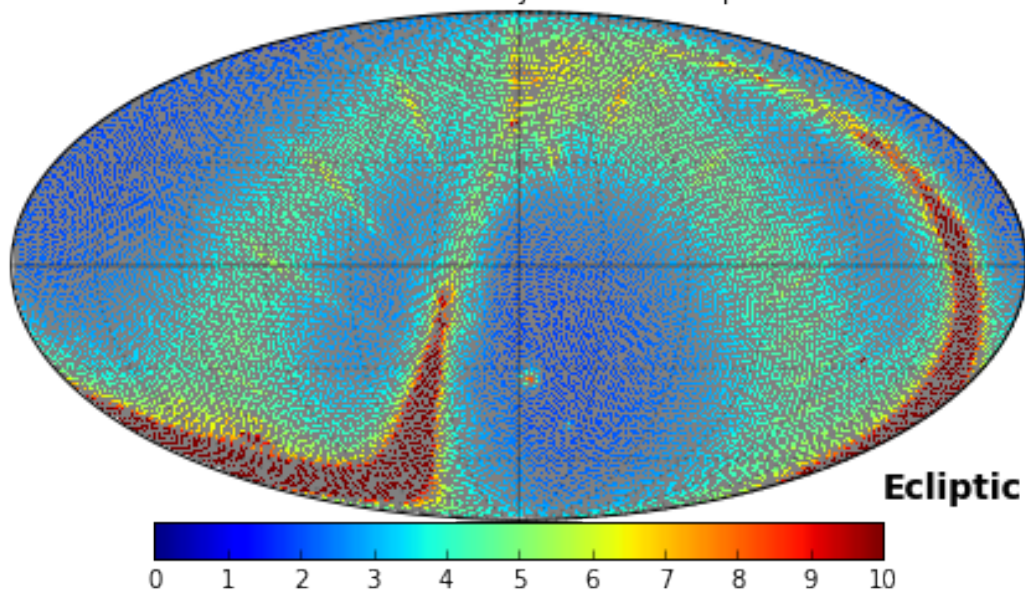
WISE CovMedian systematic map



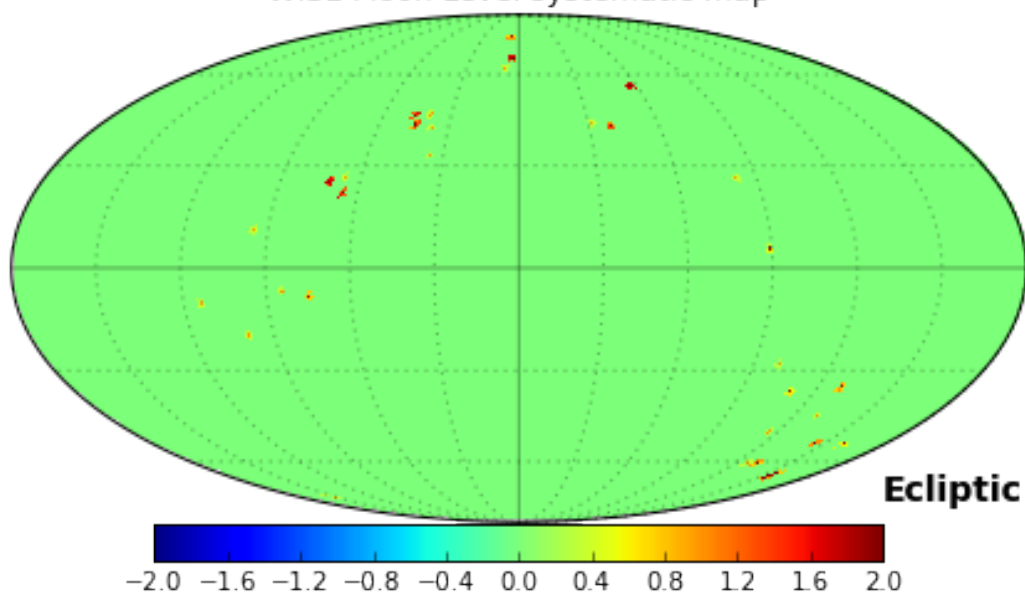
WISE Median systematic map

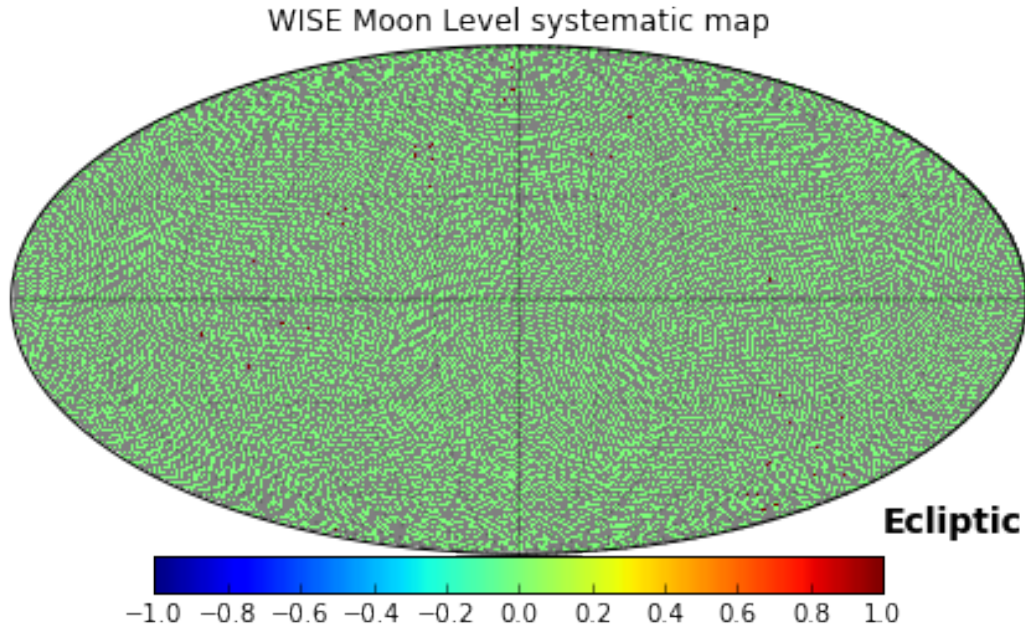


WISE Median systematic map



WISE Moon Level systematic map





```
In [6]: #checking for missing or NAN data.
print len(w1_Med_map_nn-b),max(w1_Med_map_nn-b),min(w1_Med_map_nn-b)
print len(w1_Med_map_nn[np.isnan(w1_Med_map_nn)])
print len(w1_covMed_map_nn[np.isnan(w1_covMed_map_nn)])
print len(w1_Moonlev_map_nn[np.isnan(w1_Moonlev_map_nn)])

#hp.fitsfunc.write_map("wise_sys/wise_sys_map_p8_NN.fits",(w1_covMed_map_nn,w1_Med_map_nn,w1_Mo
49152 0.0 0.0
0
0
0

In [7]: w1_covMed_map_p2 = hp.pixelfunc.ud_grade(w1_covMed_map_nn,nside_out=128, pess= True)
w1_Med_map_p2 = hp.pixelfunc.ud_grade(w1_Med_map_nn,nside_out=128, pess= True)
w1_Moonlev_map_p2 = hp.pixelfunc.ud_grade(w1_Moonlev_map_nn,nside_out=128, pess= True)

In [8]: hp.mollview(w1_covMed_map_p2,coord=['G','E'],title="WISE CovMedian systematic map",max = 100,min = -100,cb=
hp.graticule(alpha=0.35)
fig = plt.gcf()
ax = plt.gca()
image = ax.get_images()[0]
cmap = fig.colorbar(image, ax=ax,orientation="horizontal",shrink=0.5,anchor=(0.5,2.90))

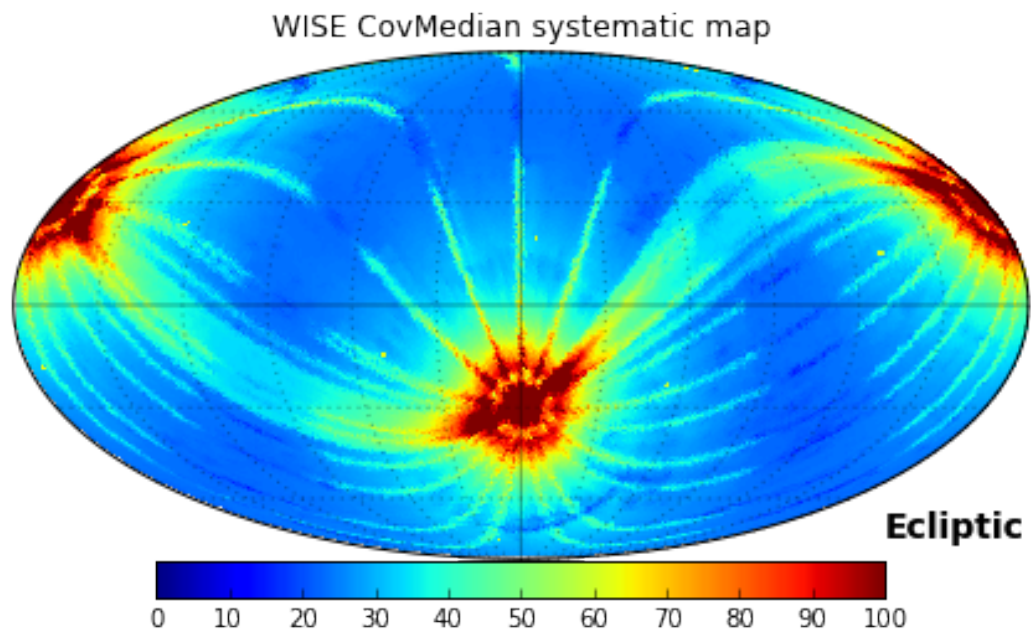
hp.mollview(w1_Med_map_p2,coord=['G','E'],title="WISE Median systematic map",max = 10,min = -10,cb=
hp.graticule(alpha=0.35)
fig = plt.gcf()
ax = plt.gca()
image = ax.get_images()[0]
cmap = fig.colorbar(image, ax=ax,orientation="horizontal",shrink=0.5,anchor=(0.5,2.90))
```

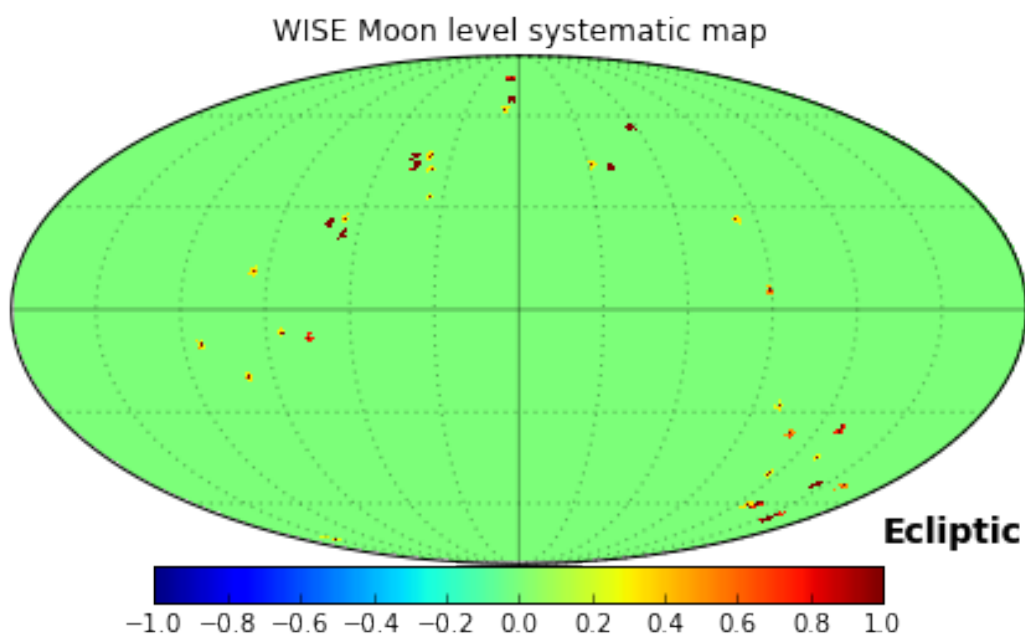
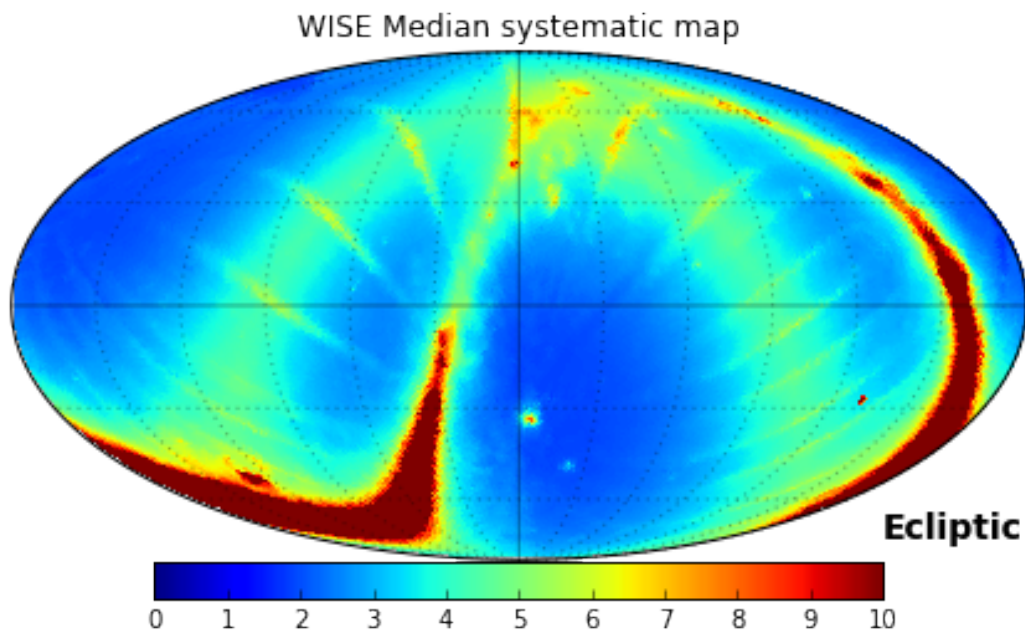
```

hp.mollview(w1_Moonlev_map_p2,coord=['G','E'],title="WISE Moon level systematic map",max = 1,mi
hp.graticule(alpha=0.35)
fig = plt.gcf()
ax = plt.gca()
image = ax.get_images()[0]
cmap = fig.colorbar(image, ax=ax,orientation="horizontal",shrink=0.5,anchor=(0.5,2.90))

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'.
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'.
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'.

```





```
In [23]: #hp.fitsfunc.write_map("wise_sys/wise_sys_map_p05_NN.fits", (w1_covMed_map_p05, w1_Med_map_p05, w1_Med_map_p05),
#hp.fitsfunc.write_map("wise_sys/wise_sys_map_p2_NN.fits", (w1_covMed_map_p2, w1_Med_map_p2, w1_Med_map_p2))
```

```
In [13]: (hp.nside2resol(512)/np.pi*180.)*2.
```

```
Out[13]: 0.013113963206424483
```

```
In [ ]:
```