All_AGNs

September 4, 2018

1 Blazars/non-blazars samples definition

These note is to define the samples of blazars and non-blazar objects for future data analysis. Eventually, we will have a list of coordinates (RA,Dec), ID and *class* for each sample.

We are going to use the 5BzCat catalog of blazars (~3000 objects) and a list of AGNs from Paolo (~13k objects).

```
In [1]: import matplotlib
        from matplotlib import pyplot as plt
        %matplotlib inline

        import seaborn as sns
        print(sns.__version__)

        import pandas as pd
        print(pd.__version__)

0.9.0
0.23.4
```

```
In [2]: %ls
```

```
4carlosAll.csv              AGNSample_Label_RA_DEC.csv
4carlosAll.csv.BKP          AGN_AllColumns.csv
4carlosSeyf.txt             All_AGNs.ipynb
4carlosall.txt              BzCat.ipynb
5BZCAT.csv*                 PastedGraphic-1.pdf
5BZCAT.csv.BKP*             VOU_Blazars/
5bzcat_label_ra_dec.csv     tmp/
AGNSample_AllColumns.csv    work/
```

1.1 AllAGNs: All AGNs sample

```
In [3]: agns = pd.read_csv('4carlosAll.csv', sep=',')
        agns.sample(10)
```

1

```
Out[3]:              Name      RA(2000)  DEC(2000)  redsh  Vmag  Radio Fl  X Fl(mJ  \
        4488     S5 0740+82   07 50 57.3   82 41 58  1.991  18.2     931.0    0.000
        13              WEE  3  00 03 26.9  -01 59 54  2.220  19.7       0.0    0.000
        10399    FBQS1626+30  16 26 59.2   30 15 35  1.580  17.5       0.0    0.000
        9648      Q 1451+4747 14 52 47.3   47 35 29  1.161  18.3      31.0    0.000
        10569    1638.8+4012  16 40 29.5   40 07 14  1.183  19.4       0.0    0.000
        6364        MARK 1298 11 29 16.7  -04 24 08  0.060  14.6       1.0    0.034
        9801     2E 1510+3902 15 12 30.7   38 50 51  0.228  18.5       0.0    0.011
        423      HBQS0035-35  00 38 17.2  -35 04 05  1.519  18.3       0.0    0.000
        5898          QNB1:20 10 43 06.6   01 08 49  2.503  20.6       0.0    0.000
        7105     Q 1217+1236  12 20 14.1   12 20 20  1.047  18.2       0.0    0.000

                         Class
        4488   QSO radio loud steep
        13            QSO radio quiet
        10399          QSO radio loud
        9648           QSO radio loud
        10569         QSO radio quiet
        6364           Seyfert type 1
        9801          Galaxy unbarred
        423           QSO radio quiet
        5898          QSO radio quiet
        7105          QSO radio quiet
```

```python
In [4]: def sex2deg(ra,dec):
            h,m,s = list(map(float,ra.split()))
            ra = s / 86400
            ra += m / 1440
            ra += h / 24
            ra *= 360

            d,m,s = dec.split()
            dec = float(s) / 3600
            dec += float(m) / 60
            if d[0] == '-':
                dec = float(d) - dec
            else:
                dec = float(d) + dec

            return ra,dec
```

```python
In [5]: ra,dec = sex2deg('00 59 44.9','-00 21 30')

        print(ra,dec)
```

```
14.937083333333332 -0.3583333333333334
```

```python
In [6]: RA_COL = 'RA(2000)'
        DEC_COL = 'DEC(2000)'
```

```python
def apply_df(df):
    try:
        bla = list(sex2deg(df[RA_COL],df[DEC_COL]))
    except:
        bla = [None,None]
    return bla

agns[['RA','DEC']] = agns.apply(apply_df, axis=1, result_type='expand')
```

In [7]: agns.index.name = 'ID'
        agns.reset_index(inplace=True)
        agns

Out[7]:

	ID	Name	RA(2000)	DEC(2000)	redsh	Vmag	Radio Fl	\
0	0	WEE 1	00 02 37.4	-02 21 12	1.740	18.5	0.0	
1	1	Q 0000+0159	00 02 38.0	02 15 58	1.073	18.1	0.0	
2	2	BG KPN 1	00 02 53.7	01 26 19	2.803	20.6	0.0	
3	3	Q 0000+025A	00 02 57.9	02 48 38	1.684	17.2	0.0	
4	4	Q 0000+027A	00 03 00.5	03 02 25	2.384	17.7	0.0	
5	5	Q 0000-029	00 03 01.4	-02 41 41	2.310	17.7	0.0	
6	6	Q 0000-398	00 03 03.6	-39 32 08	2.827	18.5	0.0	
7	7	MARK 334	00 03 09.6	21 57 36	0.022	14.6	11.0	
8	8	UM 16	00 03 10.1	04 44 55	0.058	16.1	0.0	
9	9	Q 0000+025B	00 03 19.8	02 51 34	0.310	17.7	0.0	
10	10	WEE 2	00 03 21.5	-02 00 24	2.200	20.4	0.0	
11	11	PKS 0000-17	00 03 22.1	-17 27 14	1.465	18.7	894.0	
12	12	Q 0000-26	00 03 23.0	-26 03 18	4.111	17.2	0.0	
13	13	WEE 3	00 03 26.9	-01 59 54	2.220	19.7	0.0	
14	14	Q 0000-4244	00 03 27.3	-42 27 22	1.700	20.1	0.0	
15	15	Q 0000-4239	00 03 29.2	-42 22 32	2.190	20.8	0.0	
16	16	BG KPN 2	00 03 30.3	00 08 12	2.590	20.3	0.0	
17	17	BG KPN 3	00 03 31.1	01 54 18	2.220	19.7	0.0	
18	18	NGC 7808	00 03 32.1	-10 44 40	0.029	14.8	0.0	
19	19	Q 0001+0214	00 03 36.1	02 30 49	0.232	20.7	0.0	
20	20	0001+0842	00 03 42.6	08 59 40	3.241	19.0	0.0	
21	21	TEX 0001-121	00 03 42.9	-11 51 48	1.300	17.7	0.0	
22	22	Q 0001-007A	00 03 49.9	-00 26 53	2.190	17.7	0.0	
23	23	Q 0001-0159	00 03 51.1	-01 42 45	1.364	17.4	0.0	
24	24	Q 0001-4227	00 03 50.8	-42 11 08	2.240	18.9	0.0	
25	25	BG CFH 1	00 03 55.9	-00 55 27	2.490	21.8	0.0	
26	26	Q 0001-4256	00 03 56.6	-42 39 27	2.030	18.5	0.0	
27	27	BG CFH 2	00 03 60.0	-00 30 37	0.354	20.1	0.0	
28	28	BG CFH 3	00 04 01.2	-00 39 01	2.340	20.7	0.0	
29	29	Q 0001+022A	00 04 01.6	02 31 50	2.260	18.2	0.0	
...	...	...	...	...	...	...	...	
13346	13346	PB 5679	00 00 58.1	-00 46 47	1.920	17.7	0.0	
13347	13347	KAZ 238	00 00 58.1	33 20 39	0.043	16.1	0.0	

```
13348  13348        WEE 188  00 01 01.8  -02 15 42   0.060  21.0      0.0
13349  13349  PKS 2358-161  00 01 05.4  -15 51 08   2.044  18.3    305.0
13350  13350  TEX 2358+189  00 01 08.6   19 14 34   3.100  20.2    197.0
13351  13351        PB 5682  00 01 09.4   01 26 39   0.724  18.4      0.0
13352  13352         UM 194  00 01 16.6   00 02 07   0.780  18.2      0.0
13353  13353      Q 2358+025  00 01 19.2   02 49 18   2.750  17.7      0.0
13354  13354     Q 2358+0216  00 01 21.7   02 33 04   1.872  18.3      0.0
13355  13355      Q 2358+010  00 01 29.4   01 17 10   0.370  19.0      0.0
13356  13356       2359+0653  00 01 40.6   07 09 54   3.234  18.4      0.0
13357  13357         UM 195  00 01 46.2  -01 59 34   0.867  18.3      0.0
13358  13358       BG KPN  9  00 01 46.8   00 39 59   2.897  19.6      0.0
13359  13359       BG KPN 10  00 01 47.1   00 14 27   2.120  20.5      0.0
13360  13360      Q 2359-004  00 01 49.5  -00 10 39   2.190  18.2      0.0
13361  13361       BG KPN 11  00 01 49.7   01 11 43   2.140  21.0      0.0
13362  13362         UM 196  00 01 50.0  -01 59 40   2.818  18.6      0.0
13363  13363      Q 2359-011  00 01 54.0  -00 50 04   2.780  16.7      0.0
13364  13364      Q 2359+022  00 01 56.7   02 33 25   2.370  17.7      0.0
13365  13365      Q 2359-397  00 01 58.2  -39 27 37   2.030  18.7     28.0
13366  13366        PB 5692  00 02 01.5   03 10 19   1.320  17.2      0.0
13367  13367     Q 2359+011A  00 02 06.4   01 25 25   0.810  18.7      0.0
13368  13368       BG KPN 12  00 02 12.0   00 32 51   2.670  19.7      0.0
13369  13369     Q 2359+0158  00 02 15.6   02 15 17   1.570  18.4      0.0
13370  13370        PB 5694  00 02 22.5  -00 04 44   0.810  18.3      0.0
13371  13371   CFHT 00.0207  00 02 24.5  -00 41 29   1.352  21.6      0.0
13372  13372      MARK  543  00 02 26.3   03 21 09   0.026  14.7      0.0
13373  13373       BG KPN 13  00 02 27.0   01 26 49   2.990  20.3      0.0
13374  13374        PB 5698  00 02 30.8   00 49 56   1.360  19.4      0.0
13375  13375     Q 2359-003B  00 02 31.0  -00 06 51   1.580  16.7      0.0


     X Fl(mJ              Class       RA        DEC
0     0.000        QSO radio quiet  0.655833  -2.353333
1     0.000        QSO radio quiet  0.658333   2.266111
2     0.000        QSO radio quiet  0.723750   1.438611
3     0.000        QSO radio quiet  0.741250   2.810556
4     0.000        QSO radio quiet  0.752083   3.040278
5     0.000        QSO radio quiet  0.755833  -2.694722
6     0.000   QSO radio loud flat   0.765000 -39.535556
7     0.240         Seyfert type 1  0.790000  21.960000
8     0.000         Seyfert type 2  0.792083   4.748611
9     0.000        QSO radio quiet  0.832500   2.859444
10    0.000        QSO radio quiet  0.839583  -2.006667
11    0.000   QSO radio loud steep  0.842083 -17.453889
12    0.003        QSO radio quiet  0.845833 -26.055000
13    0.000        QSO radio quiet  0.862083  -1.998333
14    0.000        QSO radio quiet  0.863750 -42.456111
15    0.000        QSO radio quiet  0.871667 -42.375556
16    0.000        QSO radio quiet  0.876250   0.136667
17    0.000        QSO radio quiet  0.879583   1.905000
```

```
18          0.000        Seyfert type 1  0.883750 -10.744444
19          0.000        Galaxy unbarred 0.900417   2.513611
20          0.000        QSO radio quiet 0.927500   8.994444
21          0.000         QSO radio loud 0.928750 -11.863333
22          0.000        QSO radio quiet 0.957917  -0.448056
23          0.000        QSO radio quiet 0.962917  -1.712500
24          0.000        QSO radio quiet 0.961667 -42.185556
25          0.000        QSO radio quiet 0.982917  -0.924167
26          0.000        QSO radio quiet 0.985833 -42.657500
27          0.000        Galaxy unbarred 1.000000  -0.510278
28          0.000        QSO radio quiet 1.005000  -0.650278
29          0.000        QSO radio quiet 1.006667   2.530556
...          ...                    ...       ...        ...
13346       0.000        QSO radio quiet 0.242083  -0.779722
13347       0.000        Seyfert type 2  0.242083  33.344167
13348       0.000        Galaxy unbarred 0.257500  -2.261667
13349       0.000   QSO radio loud steep 0.272500 -15.852222
13350       0.000    QSO radio loud flat 0.285833  19.242778
13351       0.000        QSO radio quiet 0.289167   1.444167
13352       0.000        QSO radio quiet 0.319167   0.035278
13353       0.000        QSO radio quiet 0.330000   2.821667
13354       0.000        QSO radio quiet 0.340417   2.551111
13355       0.000        Galaxy unbarred 0.372500   1.286111
13356       0.000        QSO radio quiet 0.419167   7.165000
13357       0.000        QSO radio quiet 0.442500  -1.992778
13358       0.000        QSO radio quiet 0.445000   0.666389
13359       0.000        QSO radio quiet 0.446250   0.240833
13360       0.000        QSO radio quiet 0.456250  -0.177500
13361       0.000        QSO radio quiet 0.457083   1.195278
13362       0.000        QSO radio quiet 0.458333  -1.994444
13363       0.000        QSO radio quiet 0.475000  -0.834444
13364       0.000        QSO radio quiet 0.486250   2.556944
13365       0.000    QSO radio loud flat 0.492500 -39.460278
13366       0.000        QSO radio quiet 0.506250   3.171944
13367       0.000        QSO radio quiet 0.526667   1.423611
13368       0.000        QSO radio quiet 0.550000   0.547500
13369       0.000        QSO radio quiet 0.565000   2.254722
13370       0.000        QSO radio quiet 0.593750  -0.078889
13371       0.000        Galaxy unbarred 0.602083  -0.691389
13372       0.564        Seyfert type 1  0.609583   3.352500
13373       0.000        QSO radio quiet 0.612500   1.446944
13374       0.000        QSO radio quiet 0.628333   0.832222
13375       0.000        QSO radio quiet 0.629167  -0.114167

[13376 rows x 11 columns]

In [8]: agns.groupby('Class').size().sort_values(ascending=False)

Out[8]: Class
```

```
QSO radio quiet          6842
QSO radio loud flat      1300
Galaxy unbarred          1164
Seyfert type 1            982
QSO radio loud steep      841
Seyfert type 2            467
BL Lac                    417
Radio Galaxy              299
Radio Galaxy radio l      288
QSO radio loud            246
QSO                       196
Starburst galaxy          144
unidentified               84
Liner                      51
Radio Galaxy radio q       44
Spiral galaxy mixed         3
AGN unclassified            3
Spiral galaxy               1
Non-active galaxy           1
Spiral galaxy barred        1
Elliptical galaxy           1
Cluster of galaxies         1
dtype: int64
```

1.1.1 Define the columns of interest

```python
In [9]: col = dict(ra='RA',
                   dec='DEC',
                   idn='ID',
                   name='Name',
                   redshift='redsh',
                   flux_opt='Vmag',
                   flux_radio='Radio Fl',
                   flux_xray='X Fl(mJ',
                   klass='Class'
                   )
```

```python
In [10]: # Remove objects without radio flux
         #
         agns = agns.loc[agns[col['flux_radio']] > 0]


         # Keep only the columns of interest
         #
         agns = agns[list(col.values())]

         # And let's order our catalog by their Radio flux
         #
```

```
agns = agns.sort_values(col['flux_radio'], ascending=False).reset_index(drop=True)

# Create a "label" column for running and labeling it in VOU-Blazas
#
agns['label'] = agns[col['idn']].astype(str) +'_'+ agns[col['ra']].round(4).astype(str

columns = agns.columns
columns = [columns[i-1] for i in range(len(columns))]

agns = agns[columns]
```

In [11]: agns

Out[11]:

	label	RA	DEC	ID	Name \
0	11139_299_8679_40_7339	299.867917	40.733889	11139	3C 405.0
1	7330_187_7054_12_3908	187.705417	12.390833	7330	1Jy1228+126
2	3556_50_6725_-37_2092	50.672500	-37.209167	3556	1Jy0320-374
3	3555_50_6717_-37_2075	50.671667	-37.207500	3555	For A
4	3535_49_9504_41_5117	49.950417	41.511667	3535	3C84
5	3536_49_9504_41_5117	49.950417	41.511667	3536	S40316+413
6	3537_49_9504_41_5117	49.950417	41.511667	3537	1Jy0316+413
7	7297_187_2779_2_0522	187.277917	2.052222	7297	3C 273.0
8	7296_187_2775_2_0522	187.277500	2.052222	7296	3C273
9	7295_187_2775_2_0522	187.277500	2.052222	7295	1Jy1226+023
10	12799_343_4904_16_1481	343.490417	16.148056	12799	3C454.3
11	12798_343_4904_16_1481	343.490417	16.148056	12798	1Jy2251+158
12	12797_343_4904_16_1481	343.490417	16.148056	12797	3C 454.3
13	10767_260_1171_-0_9794	260.117083	-0.979444	10767	1Jy1717-009
14	10766_260_1171_-0_9797	260.117083	-0.979722	10766	3C353
15	3971_69_2679_29_6703	69.267917	29.670278	3971	3C123
16	7869_194_0462_-5_7892	194.046250	-5.789167	7869	3C279
17	7868_194_0462_-5_7892	194.046250	-5.789167	7868	3C 279
18	7870_194_0462_-5_7892	194.046250	-5.789167	7870	1Jy1253-055
19	3970_69_2679_29_6703	69.267917	29.670278	3970	1Jy0433+295
20	4180_79_9542_-45_7794	79.954167	-45.779444	4180	Pic A
21	4179_79_9542_-45_7794	79.954167	-45.779444	4179	1Jy0518-458
22	4178_79_9542_-45_7794	79.954167	-45.779444	4178	PKS 0518-45
23	5054_139_5262_-12_0964	139.526250	-12.096389	5054	1Jy0915-118
24	5053_139_5238_-12_0953	139.523750	-12.095278	5053	3C 218
25	5052_139_5233_-12_0953	139.523333	-12.095278	5052	Hyd A
26	8453_201_3671_-43_0167	201.367083	-43.016667	8453	CENTAURUS-A
27	11990_329_2738_-69_6897	329.273750	-69.689722	11990	2152-69
28	11991_329_2742_-69_6897	329.274167	-69.689722	11991	PKS 2153-69
29	10665_252_7842_4_9906	252.784167	4.990556	10665	Her A
...	...	...	...	...	...
3797	4408_109_2108_36_91	109.210833	36.910000	4408	MS 07134+3700
3798	4060_73_1833_-3_2169	73.183333	-3.216944	4060	IRAS 04502-0317
3799	13001_351_8808_12_385	351.880833	12.385000	13001	NGC 7672

```
3800      4056_72_9054_-18_3122    72.905417 -18.312222    4056    MS 04494-1823
3801         4038_72_155_-6_32     72.155000  -6.320000    4038       NGC 1667
3802       3998_70_4075_2_0633     70.407500   2.063333    3998    MS 04390+0158
3803      3697_55_5188_-21_2442    55.518750 -21.244167    3697     ESO 548-G81
3804       3610_53_4154_-5_0894    53.415417  -5.089444    3610       NGC 1358
3805     5424_149_8733_-22_8261   149.873333 -22.826111    5424       NGC 3081
3806       5571_153_7288_0_5603   153.728750   0.560278    5571     PG 1012+008
3807      7606_190_045_10_7364    190.045000  10.736389    7606     Q 1237+1100
3808      6070_164_1092_-4_1778   164.109167  -4.177778    6070     Q 1053-038
3809      7560_189_6483_17_7619   189.648333  17.761944    7560     Q 1236+1802
3810       7368_188_015_20_1583   188.015000  20.158333    7368       TON 1542
3811      7366_187_9092_70_7339   187.909167  70.733889    7366    1ES 1229+710
3812      7350_187_8912_8_2997    187.891250   8.299722    7350     Q 1229+0834
3813      7228_186_4538_33_5469   186.453750  33.546944    7228       NGC 4395
3814       7163_185_8242_9_3856   185.824167   9.385556    7163     Q 1220+0939
3815      7141_185_4338_75_3106   185.433750  75.310556    7141     MARK   205
3816      6970_183_6675_14_4831   183.667500  14.483056    6970     Q 1212+1445
3817      6963_183_5738_14_0536   183.573750  14.053611    6963     PG 1211+143
3818      6812_181_1754_27_9033   181.175417  27.903333    6812         GQ COM
3819      6773_180_3104_-3_6778   180.310417  -3.677778    6773      MARK 1310
3820       6696_178_5517_0_1367   178.551667   0.136667    6696      MARK 1308
3821     12553_338_5375_0_0006    338.537500   0.000556   12553     Q 2231-0015
3822      6649_177_8354_54_6258   177.835417  54.625833    6649     PG 1148+549
3823      6444_174_1221_21_5961   174.122083  21.596111    6444     MARK   739E
3824      6306_170_4462_11_7386   170.446250  11.738611    6306     MARK   734
3825      6225_168_2454_21_9094   168.245417  21.909444    6225    MS 11103+2210
3826      6364_172_3196_-4_4022   172.319583  -4.402222    6364      MARK 1298


      redsh  Vmag  Radio Fl  X Fl(mJ                  Class
0     0.056  14.5  213100.0    4.013  QSO radio loud steep
1     0.004  12.9   74890.0    3.893  Radio Galaxy radio l
2     0.006   9.1   71133.0    0.111  Radio Galaxy radio l
3     0.006   8.8   71133.0    0.111  Radio Galaxy radio l
4     0.017  11.9   47261.0   17.514  Radio Galaxy radio l
5     0.018  11.9   47200.0   17.514  Radio Galaxy radio l
6     0.017  11.9   46310.0   17.514  Radio Galaxy radio l
7     0.158  12.8   40117.0   17.223   QSO radio loud flat
8     0.158  12.8   40117.0   17.223   QSO radio loud flat
9     0.158  12.8   40117.0   17.223   QSO radio loud flat
10    0.860  16.1   23261.0    1.033   QSO radio loud flat
11    0.860  16.1   23261.0    1.033   QSO radio loud flat
12    0.860  16.1   23261.0    1.033   QSO radio loud flat
13    0.030  15.4   22150.0    0.000  Radio Galaxy radio l
14    0.031  15.8   20143.0    0.000  Radio Galaxy radio l
15    0.218  19.9   16229.0    0.000  Radio Galaxy radio l
16    0.538  17.8   16110.0    1.171   QSO radio loud flat
17    0.538  17.8   16110.0    1.171   QSO radio loud flat
18    0.538  17.8   16110.0    1.171   QSO radio loud flat
```

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```
19    0.218  21.7   15940.0    0.000  Radio Galaxy radio l
20    0.035  16.0   14999.0    2.066           Radio Galaxy
21    0.035  15.8   14999.0    2.066           Radio Galaxy
22    0.035  15.8   14999.0    2.066           Radio Galaxy
23    0.055  14.8   13990.0    2.235  Radio Galaxy radio l
24    0.054  14.7   13497.0    2.235  Radio Galaxy radio l
25    0.054  14.7   13497.0    2.235  Radio Galaxy radio l
26    0.002   7.0   13367.0    5.746  Radio Galaxy radio l
27    0.027  14.0   12442.0    1.273  QSO radio loud steep
28    0.027  14.0   12442.0    1.273  QSO radio loud steep
29    0.154  16.9   12413.0    0.275           Radio Galaxy
...     ...   ...       ...      ...                    ...
3797  0.122  16.8       1.0    0.124        Seyfert type 1
3798  0.016  15.0       1.0    0.011        Seyfert type 2
3799  0.013  14.2       1.0    0.000        Seyfert type 2
3800  0.338  17.6       1.0    0.182        Seyfert type 2
3801  0.015  12.9       1.0    0.000        Seyfert type 2
3802  0.196  18.7       1.0    0.169        Seyfert type 1
3803  0.015  13.7       1.0    1.381        Seyfert type 1
3804  0.013  13.1       1.0    0.000        Seyfert type 2
3805  0.007  13.6       1.0    0.092        Seyfert type 2
3806  0.185  15.6       1.0    0.685        Seyfert type 1
3807  0.881  18.2       1.0    0.000        QSO radio quiet
3808  0.452  17.9       1.0    0.064        QSO radio quiet
3809  0.517  18.4       1.0    0.000        QSO radio loud
3810  0.064  15.3       1.0    1.237        Seyfert type 1
3811  0.208   0.0       1.0    0.705        Seyfert type 1
3812  0.761  18.3       1.0    0.000        QSO radio loud
3813  0.001  10.1       1.0    0.006        Seyfert type 1
3814  0.681  17.3       1.0    0.053        QSO radio quiet
3815  0.070  15.2       1.0    1.669        Seyfert type 1
3816  1.627  17.6       1.0    0.000        QSO radio quiet
3817  0.085  14.2       1.0    1.006        Seyfert type 1
3818  0.165  15.6       1.0    0.341        Seyfert type 1
3819  0.019  15.5       1.0    0.362        Seyfert type 1
3820  0.004  14.2       1.0    0.000      Starburst galaxy
3821  3.015  17.2       1.0    0.000        QSO radio quiet
3822  0.978  15.8       1.0    0.047        QSO radio quiet
3823  0.030  14.1       1.0    0.713        Seyfert type 1
3824  0.049  14.9       1.0    0.578        Seyfert type 1
3825  0.030  16.6       1.0    0.074        Seyfert type 1
3826  0.060  14.6       1.0    0.034        Seyfert type 1

[3827 rows x 10 columns]
```

```
In [12]: fileout = 'AGNSample_Label_RA_DEC.csv'
         agns[['label', col['ra'], col['dec']]].to_csv(fileout, index=False, sep=" ", float_fo
```

```
            fileout = 'AGNSample_AllColumns.csv'
            agns.to_csv(fileout, index=False, sep=" ", float_format='%.5f')
```

In [13]: # for gn,grp in agns.groupby('Class'):
         #   obj_class_name = gn.replace(' ','_')
         #   print(obj_class_name, len(grp))
         #   fileout = 'AGNSample_{}.csv'.format(obj_class_name)
         #   grp[['label', col['ra'], col['dec']]].to_csv(fileout, index=False, sep=" ", flo

In [14]: agns.groupby('Class').size().sort_values(ascending=False)

Out[14]: Class
         QSO radio loud flat   1298
         QSO radio loud steep   841
         BL Lac   405
         Radio Galaxy   299
         Radio Galaxy radio l   284
         Seyfert type 1   162
         QSO radio loud   135
         Seyfert type 2   120
         unidentified   56
         Starburst galaxy   53
         QSO radio quiet   47
         Radio Galaxy radio q   44
         Galaxy unbarred   27
         QSO   26
         Liner   24
         Spiral galaxy mixed   2
         Spiral galaxy   1
         Spiral galaxy barred   1
         Elliptical galaxy   1
         Cluster of galaxies   1
         dtype: int64

Spiral galaxies, Eliptical and Cluster will be removed because of low numbers

In [15]: agns = agns.dropna()

1.2 Spectra retrieval

At this point, the SED of each object (providing one) is built from `VOU-Blazars` (`VOUB` hereafter). Results of `VOUB` are placed in `./work/AGN_all_radio_non_null/Results`, in particular the SEDs go inside `SEDtool/` in that dir.

In [16]: %ls work/AGN_all_radio_non_null/Results/

```
10000_232_8554_35_5608/   2003_20_4179_-63_1506/   5300_146_9383_7_4222/
10001_232_9304_24_0717/   2004_20_6617_25_0422/    5301_147_3008_66_2497/
10002_232_9304_24_0717/   2005_20_6158_-4_3575/    5302_147_3008_66_2497/
```

10003_232_9308_24_0717/ 2006_20_6692_23_1708/ 5306_146_9175_-30_9483/
10010_233_3129_13_5403/ 200_4_1363_79_2806/ 5309_147_5683_72_2833/
10013_233_4183_35_7392/ 2014_20_7862_34_3469/ 530_10_655_3_2392/
10014_232_8892_72_1111/ 201_4_0454_-0_2536/ 5310_147_2304_40_6622/
10015_232_8904_72_1114/ 202_4_2837_81_5853/ 5311_147_2304_40_6622/
10017_233_6346_15_195/ 203_4_285_81_5856/ 5312_147_2304_40_6622/
10018_233_7183_1_5172/ 2044_21_1117_33_7994/ 5314_147_0396_-32_3961/
10019_233_7187_1_5181/ 2045_20_9767_-35_0656/ 5318_147_2742_-19_9528/
10022_233_7388_23_5033/ 2055_21_1288_11_095/ 5325_147_5446_14_3325/
10024_233_7533_53_3431/ 2056_21_1875_32_1656/ 5339_148_1133_50_8142/
10025_233_7533_53_3436/ 2062_21_1992_32_1239/ 5340_148_0329_29_2369/
10026_233_7383_58_6567/ 2064_21_1471_3_7919/ 5342_148_1104_36_1014/
10028_234_195_1_6328/ 2067_21_1446_-4_0172/ 5343_148_1329_35_2147/
10030_233_9671_49_9608/ 206_4_2583_32_1564/ 5346_148_0796_-1_6122/
10032_234_0717_46_4589/ 2070_21_1854_9_3136/ 5347_148_6975_74_5989/
10033_233_9679_57_9025/ 2071_21_4946_72_7625/ 5348_148_1892_0_0047/
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10045_234_895_47_5919/ 2091_21_3704_-0_0989/ 5357_148_8883_69_0653/
10046_235_2058_14_7958/ 2092_21_3704_-0_0994/ 5360_148_9612_69_6786/
10047_235_2062_14_7961/ 2099_21_7692_73_3869/ 5361_148_9612_69_6786/
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10053_235_5812_17_9356/ 2120_21_5621_-22_3758/ 5367_148_7371_9_4986/
10054_235_3558_53_8039/ 2122_21_6846_33_2197/ 5368_148_8688_43_9589/
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10072_236_1883_37_2189/ 2161_22_4987_23_6389/ 5391_149_2079_25_2544/
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10078_236_3758_48_7694/ 2181_22_8317_-40_7647/ 5393_149_4088_55_3825/
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10107_237_3221_50_6347/ 2269_24_1012_20_9575/ 5424_149_8733_-22_8261/
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11

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10360_245_9412_41_0822/
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10367_246_0921_39_4117/
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10369_246_445_-25_4606/
10370_246_4458_-25_4608/
10371_246_4812_-31_1353/
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10373_246_1808_37_445/
10374_246_5246_-29_8572/
10375_246_525_-29_8572/
10376_246_3096_15_7564/
10378_246_3092_26_8406/
10380_246_3679_17_2558/
10383_246_3783_27_0964/
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10394_246_49_41_5778/
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10413_247_47_24_4442/
10423_247_6925_36_2186/
10425_247_9383_11_9342/
10430_247_8042_43_8114/
10435_247_8479_42_2842/
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106_68225_42_49878_sedtool.txt	230_72867_34_23586_sedtool.txt
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107_10188_34_92839_sedtool.txt	231_17323_15_35904_sedtool.txt

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114_37571_59_68432_sedtool.txt	238_38625_12_94769_sedtool.txt
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114_73542_m67_59744_sedtool.txt	238_60050_20_19034_sedtool.txt
114_73821_m6_44936_sedtool.txt	238_66362_19_78869_sedtool.txt
114_82517_1_61792_sedtool.txt	238_83646_m79_67733_sedtool.txt
114_85054_70_38639_sedtool.txt	238_92932_11_19023_sedtool.txt
115_29204_31_20777_sedtool.txt	239_24067_m79_23439_sedtool.txt

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115_63690_49_80976_sedtool.txt      239_36810_33_07943_sedtool.txt
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115_77400_80_42892_sedtool.txt      239_46425_m0_03067_sedtool.txt
115_79121_39_69189_sedtool.txt      239_59146_m14_16647_sedtool.txt
115_88596_m67_44128_sedtool.txt     239_72983_33_38856_sedtool.txt
115_93738_23_47750_sedtool.txt      239_79012_35_02993_sedtool.txt
116_02271_74_56614_sedtool.txt      239_87909_3_08003_sedtool.txt
116_05021_29_98525_sedtool.txt      239_92242_m24_71069_sedtool.txt
116_07278_37_88812_sedtool.txt      23_18088_m16_91325_sedtool.txt
116_21154_29_33772_sedtool.txt      23_27342_m52_00158_sedtool.txt
116_38792_10_18692_sedtool.txt      23_35217_24_46186_sedtool.txt
116_41924_31_71849_sedtool.txt      23_37988_35_66819_sedtool.txt
116_47542_m0_73839_sedtool.txt      23_46971_1_22879_sedtool.txt
116_49713_33_22626_sedtool.txt      23_57571_m29_41875_sedtool.txt
116_81083_76_65481_sedtool.txt      23_89912_m38_90681_sedtool.txt
117_15046_24_00670_sedtool.txt      23_90625_m20_14608_sedtool.txt
117_15356_55_81638_sedtool.txt      240_07082_18_64172_sedtool.txt
117_34358_74_34464_sedtool.txt      240_33510_17_23702_sedtool.txt
117_58517_48_24822_sedtool.txt      240_41867_43_27978_sedtool.txt
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117_97358_33_22217_sedtool.txt      240_55078_6_24452_sedtool.txt
118_04033_58_14786_sedtool.txt      240_57537_30_85258_sedtool.txt
118_25583_53_88319_sedtool.txt      240_62707_1_96675_sedtool.txt
118_36255_33_84911_sedtool.txt      240_98311_57_51523_sedtool.txt
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11_79079_20_29158_sedtool.txt       242_41250_65_94781_sedtool.txt
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11_96408_m82_94706_sedtool.txt      243_46155_37_71751_sedtool.txt
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121_12812_64_99819_sedtool.txt      244_33678_5_44584_sedtool.txt
121_19988_10_25636_sedtool.txt      244_41204_35_01333_sedtool.txt
121_36088_75_57367_sedtool.txt      244_42384_32_36669_sedtool.txt
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121_98975_4_54292_sedtool.txt       244_45798_2_77862_sedtool.txt
122_06483_m7_85253_sedtool.txt      244_76045_30_51430_sedtool.txt
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142_65663_49_84043_sedtool.txt      268_99917_18_33842_sedtool.txt
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14_69404_m56_98675_sedtool.txt      285_73312_31_99506_sedtool.txt
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14_96692_m31_87197_sedtool.txt      288_16671_m80_16831_sedtool.txt
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154_26499_59_40782_sedtool.txt	299_49917_m38_75194_sedtool.txt
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201_08292_5_61806_sedtool.txt	45_80442_m0_25014_sedtool.txt
201_34979_m43_02725_sedtool.txt	45_85992_m24_11950_sedtool.txt
201_37292_65_25383_sedtool.txt	45_89700_47_27119_sedtool.txt
201_38912_m30_03333_sedtool.txt	45_96171_m62_19039_sedtool.txt
201_43325_m29_83356_sedtool.txt	47_10412_4_11106_sedtool.txt
201_55475_29_55969_sedtool.txt	47_26504_10_48778_sedtool.txt
201_56880_31_90265_sedtool.txt	47_48362_m60_97775_sedtool.txt
201_61093_3_44111_sedtool.txt	47_49900_17_09983_sedtool.txt
201_80358_0_40394_sedtool.txt	47_50833_m30_32667_sedtool.txt
201_83742_43_44111_sedtool.txt	47_70817_38_24819_sedtool.txt
202_26140_25_51706_sedtool.txt	47_82108_m8_91900_sedtool.txt
202_33000_m38_23856_sedtool.txt	47_98021_m76_86414_sedtool.txt
202_46129_47_19846_sedtool.txt	48_10975_39_27514_sedtool.txt

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202_52992_m21_70125_sedtool.txt    48_18154_1_55475_sedtool.txt
202_53125_m20_93836_sedtool.txt    48_25775_41_33392_sedtool.txt
202_57946_m31_38300_sedtool.txt    48_55715_m7_83984_sedtool.txt
202_65706_25_15302_sedtool.txt     48_75617_42_03578_sedtool.txt
202_77988_30_49556_sedtool.txt     48_84492_m3_27950_sedtool.txt
202_79871_m26_65267_sedtool.txt    48_96742_m19_11078_sedtool.txt
202_87146_m3_68725_sedtool.txt     49_22633_34_62075_sedtool.txt
202_90796_m17_61200_sedtool.txt    49_43592_m55_10922_sedtool.txt
203_01867_m5_16185_sedtool.txt     49_57392_41_86986_sedtool.txt
203_10046_11_10589_sedtool.txt     49_95067_41_51169_sedtool.txt
203_22197_2_01262_sedtool.txt      49_96542_18_76014_sedtool.txt
203_39905_16_81783_sedtool.txt     4_04617_m0_25346_sedtool.txt
203_53825_55_03128_sedtool.txt     4_13171_79_28103_sedtool.txt
203_57733_m10_15814_sedtool.txt    4_25862_32_15517_sedtool.txt
203_84150_45_71061_sedtool.txt     4_28546_81_58564_sedtool.txt
203_85804_58_73342_sedtool.txt     4_61562_29_79178_sedtool.txt
203_87367_m29_84358_sedtool.txt    4_81067_15_93453_sedtool.txt
204_00832_17_42040_sedtool.txt     4_90754_20_36264_sedtool.txt
204_01177_27_46429_sedtool.txt     4_91021_26_06114_sedtool.txt
204_08832_3_33093_sedtool.txt      4_94083_73_45825_sedtool.txt
204_14829_m33_95550_sedtool.txt    50_03629_m19_63658_sedtool.txt
204_28400_11_67414_sedtool.txt     50_11934_m2_14448_sedtool.txt
204_32800_24_38429_sedtool.txt     50_47129_12_35389_sedtool.txt
204_41596_m12_95683_sedtool.txt    50_67346_m37_20711_sedtool.txt
204_41721_39_15503_sedtool.txt     51_17221_34_17917_sedtool.txt
204_45684_55_01730_sedtool.txt     51_35567_m6_14383_sedtool.txt
204_53110_28_08581_sedtool.txt     51_55825_2_42094_sedtool.txt
204_53454_m6_45394_sedtool.txt     51_97583_2_56167_sedtool.txt
204_56525_4_54876_sedtool.txt      51_99967_m22_03511_sedtool.txt
204_57209_48_27588_sedtool.txt     52_34954_39_79239_sedtool.txt
204_70777_38_85172_sedtool.txt     52_47533_m23_95269_sedtool.txt
204_84908_63_48289_sedtool.txt     52_49029_27_93764_sedtool.txt
204_88655_m0_27313_sedtool.txt     52_61350_41_02836_sedtool.txt
204_98300_m31_64097_sedtool.txt    52_71743_5_64055_sedtool.txt
205_01921_m1_62958_sedtool.txt     52_77662_m38_40161_sedtool.txt
205_09567_37_91217_sedtool.txt     52_78721_m25_41200_sedtool.txt
205_27138_39_99601_sedtool.txt     53_18329_m44_93272_sedtool.txt
205_27554_67_67247_sedtool.txt     53_30225_m36_32986_sedtool.txt
205_28365_39_24647_sedtool.txt     53_40192_m36_14053_sedtool.txt
205_29641_30_37812_sedtool.txt     53_41562_m5_08956_sedtool.txt
205_52733_5_09005_sedtool.txt      53_55650_m40_14075_sedtool.txt
205_53478_35_65429_sedtool.txt     53_56983_39_34431_sedtool.txt
205_53492_27_15853_sedtool.txt     53_72217_8_00400_sedtool.txt
205_54373_28_46952_sedtool.txt     54_12550_32_30811_sedtool.txt
205_68172_5_07473_sedtool.txt      54_19258_m35_99925_sedtool.txt
205_72350_28_46503_sedtool.txt     54_22504_m36_26808_sedtool.txt
205_75050_28_73528_sedtool.txt     54_48138_m12_06783_sedtool.txt
205_94146_66_04047_sedtool.txt     54_68150_m35_39075_sedtool.txt
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206_03617_66_10322_sedtool.txt    54_74658_m43_82342_sedtool.txt
206_17566_55_88700_sedtool.txt    54_75392_m1_55497_sedtool.txt
206_40395_38_38684_sedtool.txt    54_87892_m1_77661_sedtool.txt
206_53654_73_34897_sedtool.txt    55_14842_m21_32547_sedtool.txt
206_76811_11_10629_sedtool.txt    55_51329_m21_24719_sedtool.txt
206_88907_12_29003_sedtool.txt    55_52250_m37_05581_sedtool.txt
206_90604_30_21448_sedtool.txt    55_87063_36_37011_sedtool.txt
206_91318_58_21149_sedtool.txt    55_87281_4_96184_sedtool.txt
207_01797_28_67373_sedtool.txt    56_62742_m34_37950_sedtool.txt
207_06312_m42_17264_sedtool.txt   56_91748_1_08729_sedtool.txt
207_21864_26_59273_sedtool.txt    57_15908_m27_82064_sedtool.txt
207_33012_m30_30936_sedtool.txt   57_31417_m24_02067_sedtool.txt
207_38083_m11_54842_sedtool.txt   57_34392_m11_98733_sedtool.txt
207_39460_53_68799_sedtool.txt    57_79562_m11_88961_sedtool.txt
207_47021_2_07930_sedtool.txt     57_97829_m37_06158_sedtool.txt
207_56267_38_20189_sedtool.txt    58_12511_m7_18405_sedtool.txt
207_63488_38_98969_sedtool.txt    58_60425_m16_27292_sedtool.txt
207_76863_0_52207_sedtool.txt     58_69258_80_15811_sedtool.txt
208_07434_31_44624_sedtool.txt    58_70812_m38_16536_sedtool.txt
208_23508_m44_21122_sedtool.txt   58_72962_72_91097_sedtool.txt
208_26617_69_30797_sedtool.txt    58_99729_2_94014_sedtool.txt
208_31600_63_76269_sedtool.txt    59_15646_20_83669_sedtool.txt
208_32415_33_49084_sedtool.txt    59_34092_m48_20397_sedtool.txt
208_36684_56_01582_sedtool.txt    59_43038_m7_85406_sedtool.txt
208_39969_26_52987_sedtool.txt    59_72329_10_42889_sedtool.txt
208_46496_1_86480_sedtool.txt     5_60592_0_24891_sedtool.txt
208_52677_23_43033_sedtool.txt    5_92904_5_87517_sedtool.txt
208_52871_m2_10093_sedtool.txt    60_28179_0_60919_sedtool.txt
208_69554_m10_68400_sedtool.txt   60_58854_m31_79078_sedtool.txt
208_92108_40_46353_sedtool.txt    60_77321_26_00028_sedtool.txt
208_92130_30_40333_sedtool.txt    60_97412_m36_08381_sedtool.txt
208_97303_38_57459_sedtool.txt    61_39142_m13_13733_sedtool.txt
209_01192_18_37194_sedtool.txt    61_45512_38_05911_sedtool.txt
209_26685_19_32277_sedtool.txt    61_55096_m17_83275_sedtool.txt
209_27525_m17_73386_sedtool.txt   61_74575_m38_44117_sedtool.txt
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209_29700_m15_45819_sedtool.txt   61_95183_m12_19261_sedtool.txt
209_41912_43_89994_sedtool.txt    62_20196_m75_12222_sedtool.txt
209_48100_76_72247_sedtool.txt    62_27400_m12_64669_sedtool.txt
209_56629_57_87193_sedtool.txt    62_34175_12_29422_sedtool.txt
209_66946_47_63286_sedtool.txt    62_41896_m19_80050_sedtool.txt
209_74304_m41_87686_sedtool.txt   63_18167_23_08503_sedtool.txt
209_85740_2_00205_sedtool.txt     63_41329_11_21286_sedtool.txt
209_97490_59_18254_sedtool.txt    63_72025_m7_92728_sedtool.txt
20_13208_m27_02353_sedtool.txt    63_78846_m29_48500_sedtool.txt
20_25042_3_73900_sedtool.txt      64_01804_m20_94108_sedtool.txt
20_41737_m63_15006_sedtool.txt    64_15246_m18_85233_sedtool.txt
20_42333_11_83065_sedtool.txt     64_22033_1_09069_sedtool.txt
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20_48691_4_37346_sedtool.txt	64_32062_m5_89739_sedtool.txt
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20_66171_25_04217_sedtool.txt	65_56183_m38_74769_sedtool.txt
20_78562_34_34653_sedtool.txt	65_57638_19_84883_sedtool.txt
20_97738_m35_06597_sedtool.txt	65_71750_2_32425_sedtool.txt
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210_68327_16_00086_sedtool.txt	66_19517_0_60186_sedtool.txt
211_04413_9_62929_sedtool.txt	66_46375_m8_56022_sedtool.txt
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211_58917_22_39564_sedtool.txt	68_08717_m51_15792_sedtool.txt
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212_34960_26_30583_sedtool.txt	69_40246_m29_90147_sedtool.txt
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212_98018_34_25289_sedtool.txt	6_17908_m42_03442_sedtool.txt
213_31199_m3_20766_sedtool.txt	6_35900_39_32650_sedtool.txt
213_45139_44_00386_sedtool.txt	6_67383_35_14508_sedtool.txt
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213_99509_13_33995_sedtool.txt	70_17900_m16_48739_sedtool.txt
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215_77567_48_03633_sedtool.txt   72_90367_m18_31308_sedtool.txt
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216_23702_20_00793_sedtool.txt   73_84862_m20_57050_sedtool.txt
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219_54496_m31_37458_sedtool.txt   80_25575_m25_36250_sedtool.txt
219_68651_62_19837_sedtool.txt   80_29138_16_63950_sedtool.txt
219_82291_39_54524_sedtool.txt   80_64204_m61_13289_sedtool.txt
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21_14542_3_79154_sedtool.txt   82_53238_79_34850_sedtool.txt
21_18550_9_31369_sedtool.txt   82_53325_m25_05833_sedtool.txt
21_18858_32_16581_sedtool.txt   82_73517_13_53203_sedtool.txt

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21_18946_32_13461_sedtool.txt      84_09292_m20_09206_sedtool.txt
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21_37021_m0_09889_sedtool.txt      84_88342_m15_84161_sedtool.txt
21_38125_32_13506_sedtool.txt      84_97629_m28_66558_sedtool.txt
21_50254_m1_34792_sedtool.txt      85_31729_53_20686_sedtool.txt
21_56246_m22_37578_sedtool.txt     85_40875_m5_69719_sedtool.txt
21_67825_25_98350_sedtool.txt      85_51883_69_37628_sedtool.txt
21_76967_73_38686_sedtool.txt      85_65062_49_85214_sedtool.txt
21_81042_m41_21261_sedtool.txt     87_66654_m32_27572_sedtool.txt
21_93350_m34_96575_sedtool.txt     88_04725_m7_45628_sedtool.txt
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220_99425_63_54069_sedtool.txt     8_96929_59_83489_sedtool.txt
221_14531_63_60169_sedtool.txt     8_98121_15_88797_sedtool.txt
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221_31868_9_97675_sedtool.txt      91_14846_44_23292_sedtool.txt
221_71342_21_53094_sedtool.txt     91_96950_67_34878_sedtool.txt
222_06283_m16_34003_sedtool.txt    91_99892_m8_58061_sedtool.txt
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222_33630_42_35039_sedtool.txt     92_38554_48_07117_sedtool.txt
222_34080_63_27063_sedtool.txt     92_42083_m15_71125_sedtool.txt
222_76046_m23_49197_sedtool.txt    92_70362_72_81478_sedtool.txt
222_78669_27_15743_sedtool.txt     93_43112_71_12422_sedtool.txt
222_94708_m1_45638_sedtool.txt     93_45562_26_07706_sedtool.txt
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223_19739_47_59141_sedtool.txt     93_90108_71_03753_sedtool.txt
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223_63708_m40_20903_sedtool.txt    95_13379_m25_25486_sedtool.txt
223_97304_m11_13694_sedtool.txt    95_42833_m52_69128_sedtool.txt
224_01510_50_80721_sedtool.txt     95_78163_m64_60619_sedtool.txt
224_78179_71_67219_sedtool.txt     95_88200_m44_21722_sedtool.txt
225_25765_22_63514_sedtool.txt     95_90821_m52_96583_sedtool.txt
225_87041_4_33029_sedtool.txt      96_07917_38_94686_sedtool.txt
226_03846_60_01542_sedtool.txt     96_51192_82_04050_sedtool.txt
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226_10407_10_49412_sedtool.txt     96_76200_m35_48669_sedtool.txt
226_23800_26_01621_sedtool.txt     97_34908_m19_98878_sedtool.txt
226_27695_3_44190_sedtool.txt      97_79996_m41_90747_sedtool.txt
226_53981_37_51415_sedtool.txt     98_41183_17_99261_sedtool.txt
226_60300_83_32444_sedtool.txt     98_93771_m75_27092_sedtool.txt
226_71371_42_65580_sedtool.txt     99_84121_73_41619_sedtool.txt
```

```
226_77000_m16_87506_sedtool.txt    9_02729_18_63306_sedtool.txt
227_09887_33_78351_sedtool.txt     9_21800_m33_55350_sedtool.txt
227_44978_55_93813_sedtool.txt     9_26517_m1_14806_sedtool.txt
227_51235_57_04545_sedtool.txt     9_40300_39_63678_sedtool.txt
227_60025_70_75908_sedtool.txt     9_44225_36_98642_sedtool.txt
227_72330_m5_71858_sedtool.txt     9_49296_24_11989_sedtool.txt
227_96004_m32_71533_sedtool.txt    9_56142_m24_98389_sedtool.txt
227_99925_m21_31669_sedtool.txt    9_58360_m2_12588_sedtool.txt
228_06390_2_05797_sedtool.txt      9_60346_41_61839_sedtool.txt
228_21058_m9_10025_sedtool.txt     9_61204_m38_99617_sedtool.txt
```

1.3 Recover results

To read the resulting SEDs, for each object, we may have to do some small processing on the RA/Dec values of each object to properly relate to the data/SED files. The reason is the name convention used used in the output files: * directories in `Results/` are named after the given/input RA and Dec values; on the other hand, * directories in `Results/SEDtool/` are named after the object's (assumed) Radio source position.

To correlate those results to the original table, we may simply parse the (file/directory) in hands and truncate the decimal part to – say – 2 digits.

```python
In [18]: ra_s1 = agns[col['ra']].astype(str)
         ra_s1 = [s.split('.') for s in ra_s1]
         ra_s1 = ['_'.join([l[0],l[1][:3]]) for l in ra_s1]

         dec_s1 = agns[col['dec']].astype(str)
         dec_s1 = [s.split('.') for s in dec_s1]
         dec_s1 = ['_'.join([l[0],l[1][:3]]).replace('-','m') for l in dec_s1]

         ids = agns['label']

In [19]: from os import path
         from glob import glob
         seds = [path.basename(p) for p in glob('work/AGN_all_radio_non_null/Results/SEDtool/*_
         seds_filename = seds[:]

         seds = [s.replace('_sedtool.txt','') for s in seds]

         seds = [s.split('_') for s in seds]

         ra_s2 = ['_'.join([l[0],l[1][:3]]) for l in seds]

         dec_s2 = ['_'.join([l[2],l[3][:3]]) for l in seds]

In [20]: df1 = pd.DataFrame(data={'ra_1':ra_s1, 'dec_1':dec_s1, 'ids':ids})

         df2 = pd.DataFrame(data={'ra_2':ra_s2, 'dec_2':dec_s2, 'filenames':seds_filename})
```

```
In [21]: df1.head()

Out[21]:        ra_1     dec_1                      ids
         0   299_867    40_733   11139_299_8679_40_7339
         1   187_705    12_390    7330_187_7054_12_3908
         2    50_672   m37_209   3556_50_6725_-37_2092
         3    50_671   m37_207   3555_50_6717_-37_2075
         4    49_950    41_511    3535_49_9504_41_5117

In [22]: df2.head()

Out[22]:       ra_2     dec_2                         filenames
         0     0_084   m32_349    0_08471_m32_34972_sedtool.txt
         1     0_272   m15_851    0_27204_m15_85194_sedtool.txt
         2     0_285    19_242     0_28596_19_24286_sedtool.txt
         3     0_790    21_960     0_79004_21_96022_sedtool.txt
         4   100_517    67_976   100_51762_67_97656_sedtool.txt

In [23]: df1['radec1'] = df1.apply(lambda x:'_'.join([x['ra_1'],x['dec_1']]), axis=1)
         # df1.sort_values(['ra_1','dec_1'], inplace=True)

In [24]: df2['radec2'] = df2.apply(lambda x:'_'.join([x['ra_2'],x['dec_2']]), axis=1)
         # df2.sort_values(['ra_2','dec_2'], inplace=True)

In [25]: df3 = df1.merge(df2, left_on='radec1', right_on='radec2', how='inner')
         df3

Out[25]:         ra_1     dec_1                       ids            radec1     ra_2 \
         0     49_950    41_511     3535_49_9504_41_5117    49_950_41_511    49_950
         1     49_950    41_511     3536_49_9504_41_5117    49_950_41_511    49_950
         2     49_950    41_511     3537_49_9504_41_5117    49_950_41_511    49_950
         3    343_490    16_148   12799_343_4904_16_1481   343_490_16_148   343_490
         4    343_490    16_148   12798_343_4904_16_1481   343_490_16_148   343_490
         5    343_490    16_148   12797_343_4904_16_1481   343_490_16_148   343_490
         6    324_160     0_698    11775_324_1604_0_6983    324_160_0_698   324_160
         7    324_160     0_698    11776_324_1604_0_6983    324_160_0_698   324_160
         8     80_741   m36_458    4187_80_7413_-36_4583   80_741_m36_458    80_741
         9     80_741   m36_458    4189_80_7413_-36_4583   80_741_m36_458    80_741
         10    80_741   m36_458    4188_80_7413_-36_4583   80_741_m36_458    80_741
         11   141_762    39_039    5121_141_7625_39_0392   141_762_39_039   141_762
         12   172_529   m14_824   6370_172_5292_-14_8242   172_529_m14_824  172_529
         13   172_529   m14_824   6371_172_5292_-14_8242   172_529_m14_824  172_529
         14    70_071   m43_552    3992_70_0712_-43_5522   70_071_m43_552    70_071
         15    70_071   m43_552    3994_70_0717_-43_5525   70_071_m43_552    70_071
         16   212_835    52_202    9229_212_8354_52_2022   212_835_52_202   212_835
         17   212_835    52_202    9227_212_8354_52_2025   212_835_52_202   212_835
         18   212_835    52_202    9228_212_8354_52_2022   212_835_52_202   212_835
         19   294_854   m63_712  11096_294_8542_-63_7128  294_854_m63_712   294_854
         20   277_382    48_746   10984_277_3821_48_7461   277_382_48_746   277_382
```

21	277_382	48_746	10985_277_3821_48_7461	277_382_48_746	277_382
22	277_382	48_746	10986_277_3821_48_7461	277_382_48_746	277_382
23	277_382	48_746	10987_277_3825_48_7461	277_382_48_746	277_382
24	88_878	39_813	4260_88_8783_39_8136	88_878_39_813	88_878
25	24_421	33_159	2290_24_4217_33_1597	24_421_33_159	24_421
26	24_421	33_159	2291_24_4217_33_1597	24_421_33_159	24_421
27	327_022	6_960	11952_327_0229_6_9608	327_022_6_960	327_022
28	327_022	6_960	11951_327_0225_6_9606	327_022_6_960	327_022
29	327_022	6_960	11950_327_0225_6_9606	327_022_6_960	327_022
...	...	...	...	...	...
1085	169_786	21_321	6285_169_7867_21_3217	169_786_21_321	169_786
1086	13_395	12_693	994_13_3954_12_6933	13_395_12_693	13_395
1087	211_044	9_629	9152_211_0442_9_6294	211_044_9_629	211_044
1088	213_942	11_495	9258_213_9429_11_4956	213_942_11_495	213_942
1089	189_914	m5_344	7581_189_9142_-5_3442	189_914_m5_344	189_914
1090	1_862	2_686	99_1_8629_2_6867	1_862_2_686	1_862
1091	208_324	33_490	9042_208_3242_33_4908	208_324_33_490	208_324
1092	108_562	45_698	4402_108_5629_45_6989	108_562_45_698	108_562
1093	201_082	5_618	8442_201_0829_5_6181	201_082_5_618	201_082
1094	141_303	52_286	5106_141_3037_52_2864	141_303_52_286	141_303
1095	323_115	10_138	11683_323_1158_10_1386	323_115_10_138	323_115
1096	179_117	55_125	6719_179_1171_55_125	179_117_55_125	179_117
1097	31_957	2_715	2674_31_9575_2_7153	31_957_2_715	31_957
1098	21_185	9_313	2070_21_1854_9_3136	21_185_9_313	21_185
1099	1_791	0_891	94_1_7917_0_8914	1_791_0_891	1_791
1100	212_706	1_859	9212_212_7062_1_8594	212_706_1_859	212_706
1101	211_317	25_926	9162_211_3175_25_9261	211_317_25_926	211_317
1102	208_526	23_430	9055_208_5267_23_4303	208_526_23_430	208_526
1103	205_534	35_654	8822_205_5346_35_6542	205_534_35_654	205_534
1104	213_451	44_003	9243_213_4512_44_0039	213_451_44_003	213_451
1105	220_531	35_439	9537_220_5312_35_4397	220_531_35_439	220_531
1106	239_790	35_029	10189_239_79_35_0297	239_790_35_029	239_790
1107	222_786	27_157	9640_222_7867_27_1575	222_786_27_157	222_786
1108	125_653	54_310	4641_125_6533_54_3103	125_653_54_310	125_653
1109	53_415	m5_089	3610_53_4154_-5_0894	53_415_m5_089	53_415
1110	153_728	0_560	5571_153_7288_0_5603	153_728_0_560	153_728
1111	186_453	33_546	7228_186_4538_33_5469	186_453_33_546	186_453
1112	183_573	14_053	6963_183_5738_14_0536	183_573_14_053	183_573
1113	177_835	54_625	6649_177_8354_54_6258	177_835_54_625	177_835
1114	170_446	11_738	6306_170_4462_11_7386	170_446_11_738	170_446

	dec_2	filenames	radec2
0	41_511	49_95067_41_51169_sedtool.txt	49_950_41_511
1	41_511	49_95067_41_51169_sedtool.txt	49_950_41_511
2	41_511	49_95067_41_51169_sedtool.txt	49_950_41_511
3	16_148	343_49042_16_14817_sedtool.txt	343_490_16_148
4	16_148	343_49042_16_14817_sedtool.txt	343_490_16_148
5	16_148	343_49042_16_14817_sedtool.txt	343_490_16_148

6	0_698	324_16074_0_69843_sedtool.txt	324_160_0_698
7	0_698	324_16074_0_69843_sedtool.txt	324_160_0_698
8	m36_458	80_74179_m36_45833_sedtool.txt	80_741_m36_458
9	m36_458	80_74179_m36_45833_sedtool.txt	80_741_m36_458
10	m36_458	80_74179_m36_45833_sedtool.txt	80_741_m36_458
11	39_039	141_76260_39_03909_sedtool.txt	141_762_39_039
12	m14_824	172_52938_m14_82422_sedtool.txt	172_529_m14_824
13	m14_824	172_52938_m14_82422_sedtool.txt	172_529_m14_824
14	m43_552	70_07112_m43_55250_sedtool.txt	70_071_m43_552
15	m43_552	70_07112_m43_55250_sedtool.txt	70_071_m43_552
16	52_202	212_83580_52_20264_sedtool.txt	212_835_52_202
17	52_202	212_83580_52_20264_sedtool.txt	212_835_52_202
18	52_202	212_83580_52_20264_sedtool.txt	212_835_52_202
19	m63_712	294_85454_m63_71267_sedtool.txt	294_854_m63_712
20	48_746	277_38250_48_74631_sedtool.txt	277_382_48_746
21	48_746	277_38250_48_74631_sedtool.txt	277_382_48_746
22	48_746	277_38250_48_74631_sedtool.txt	277_382_48_746
23	48_746	277_38250_48_74631_sedtool.txt	277_382_48_746
24	39_813	88_87833_39_81350_sedtool.txt	88_878_39_813
25	33_159	24_42196_33_15989_sedtool.txt	24_421_33_159
26	33_159	24_42196_33_15989_sedtool.txt	24_421_33_159
27	6_960	327_02276_6_96073_sedtool.txt	327_022_6_960
28	6_960	327_02276_6_96073_sedtool.txt	327_022_6_960
29	6_960	327_02276_6_96073_sedtool.txt	327_022_6_960
...	...	...	...
1085	21_321	169_78622_21_32159_sedtool.txt	169_786_21_321
1086	12_693	13_39550_12_69330_sedtool.txt	13_395_12_693
1087	9_629	211_04413_9_62929_sedtool.txt	211_044_9_629
1088	11_495	213_94272_11_49547_sedtool.txt	213_942_11_495
1089	m5_344	189_91435_m5_34422_sedtool.txt	189_914_m5_344
1090	2_686	1_86280_2_68698_sedtool.txt	1_862_2_686
1091	33_490	208_32415_33_49084_sedtool.txt	208_324_33_490
1092	45_698	108_56290_45_69881_sedtool.txt	108_562_45_698
1093	5_618	201_08292_5_61806_sedtool.txt	201_082_5_618
1094	52_286	141_30349_52_28623_sedtool.txt	141_303_52_286
1095	10_138	323_11581_10_13871_sedtool.txt	323_115_10_138
1096	55_125	179_11730_55_12529_sedtool.txt	179_117_55_125
1097	2_715	31_95783_2_71542_sedtool.txt	31_957_2_715
1098	9_313	21_18550_9_31369_sedtool.txt	21_185_9_313
1099	0_891	1_79171_0_89127_sedtool.txt	1_791_0_891
1100	1_859	212_70638_1_85964_sedtool.txt	212_706_1_859
1101	25_926	211_31748_25_92637_sedtool.txt	211_317_25_926
1102	23_430	208_52677_23_43033_sedtool.txt	208_526_23_430
1103	35_654	205_53478_35_65429_sedtool.txt	205_534_35_654
1104	44_003	213_45139_44_00386_sedtool.txt	213_451_44_003
1105	35_439	220_53114_35_43973_sedtool.txt	220_531_35_439
1106	35_029	239_79012_35_02993_sedtool.txt	239_790_35_029
1107	27_157	222_78669_27_15743_sedtool.txt	222_786_27_157

```
1108    54_310    125_65339_54_31012_sedtool.txt    125_653_54_310
1109    m5_089     53_41562_m5_08956_sedtool.txt     53_415_m5_089
1110     0_560     153_72879_0_56026_sedtool.txt     153_728_0_560
1111    33_546    186_45382_33_54680_sedtool.txt    186_453_33_546
1112    14_053    183_57348_14_05336_sedtool.txt    183_573_14_053
1113    54_625    177_83515_54_62583_sedtool.txt    177_835_54_625
1114    11_738    170_44615_11_73852_sedtool.txt    170_446_11_738

[1115 rows x 8 columns]
```

In [26]: agns_results = agns.merge(df3[['ids','filenames']], left_on='label', right_on='ids')
         agns_results

```
Out[26]:                         label          RA         DEC      ID           Name  \
         0            3535_49_9504_41_5117    49.950417   41.511667    3535           3C84
         1            3536_49_9504_41_5117    49.950417   41.511667    3536      S40316+413
         2            3537_49_9504_41_5117    49.950417   41.511667    3537     1Jy0316+413
         3          12799_343_4904_16_1481   343.490417   16.148056   12799         3C454.3
         4          12798_343_4904_16_1481   343.490417   16.148056   12798     1Jy2251+158
         5          12797_343_4904_16_1481   343.490417   16.148056   12797        3C 454.3
         6           11775_324_1604_0_6983   324.160417    0.698333   11775            OX57
         7           11776_324_1604_0_6983   324.160417    0.698333   11776     1Jy2134+004
         8           4187_80_7413_-36_4583    80.741250  -36.458333    4187         0521-36
         9           4189_80_7413_-36_4583    80.741250  -36.458333    4189     1Jy0521-365
         10          4188_80_7413_-36_4583    80.741250  -36.458333    4188     PKS 0521-365
         11          5121_141_7625_39_0392   141.762500   39.039167    5121       B2 0923+39
         12         6370_172_5292_-14_8242   172.529167  -14.824167    6370      PKS 1127-14
         13          3992_70_0712_-43_5522    70.071250  -43.552222    3992     1Jy0438-436
         14          3994_70_0717_-43_5525    70.071667  -43.552500    3994      PKS 0438-43
         15          9229_212_8354_52_2022   212.835417   52.202222    9229     1Jy1409+524
         16         6371_172_5292_-14_8242   172.529167  -14.824167    6371     1Jy1127-145
         17          9227_212_8354_52_2025   212.835417   52.202500    9227           3C295
         18          9228_212_8354_52_2022   212.835417   52.202222    9228      S41409+524
         19        11096_294_8542_-63_7128   294.854167  -63.712778   11096      PKS 1934-63
         20         10984_277_3821_48_7461   277.382083   48.746111   10984           3C380
         21         10985_277_3821_48_7461   277.382083   48.746111   10985      S41828+487
         22         10986_277_3821_48_7461   277.382083   48.746111   10986     1Jy1828+487
         23         10987_277_3825_48_7461   277.382500   48.746111   10987        3C 380.0
         24           4260_88_8783_39_8136    88.878333   39.813611    4260      B2 0552+39A
         25           2290_24_4217_33_1597    24.421667   33.159722    2290            3C48
         26           2291_24_4217_33_1597    24.421667   33.159722    2291     1Jy0134+329
         27          11952_327_0229_6_9608   327.022917    6.960833   11952      PKS 2145+06
         28          11951_327_0225_6_9606   327.022500    6.960556   11951     1Jy2145+067
         29          11950_327_0225_6_9606   327.022500    6.960556   11950         4C06.69
         ...                            ...          ...         ...     ...             ...
         1085         6285_169_7867_21_3217   169.786667   21.321667    6285      PG 1116+215
         1086          994_13_3954_12_6933    13.395417   12.693333     994            I ZW 1
         1087          9152_211_0442_9_6294   211.044167    9.629444    9152     2E 1401+0952
```

		redsh	Vmag	Radio Fl	X Fl(mJ		Class	\

1088	9258_213_9429_11_4956	213.942917	11.495556	9258	H 1413+117
1089	7581_189_9142_-5_3442	189.914167	-5.344167	7581	NGC 4593
1090	99_1_8629_2_6867	1.862917	2.686667	99	UM 202
1091	9042_208_3242_33_4908	208.324167	33.490833	9042	NGC 5347
1092	4402_108_5629_45_6989	108.562917	45.698889	4402	MARK 376
1093	8442_201_0829_5_6181	201.082917	5.618056	8442	IRAS 13218+0552
1094	5106_141_3037_52_2864	141.303750	52.286389	5106	MARK 110
1095	11683_323_1158_10_1386	323.115833	10.138611	11683	II ZW 136
1096	6719_179_1171_55_125	179.117083	55.125000	6719	NGC 3982
1097	2674_31_9575_2_7153	31.957500	2.715278	2674	MARK 586
1098	2070_21_1854_9_3136	21.185417	9.313611	2070	MS0122.1+0903
1099	94_1_7917_0_8914	1.791667	0.891389	94	UM 200
1100	9212_212_7062_1_8594	212.706250	1.859444	9212	1E 1408+020
1101	9162_211_3175_25_9261	211.317500	25.926111	9162	PG 1402+261
1102	9055_208_5267_23_4303	208.526667	23.430278	9055	MARK 662
1103	8822_205_5346_35_6542	205.534583	35.654167	8822	NGC 5273
1104	9243_213_4512_44_0039	213.451250	44.003889	9243	PG 1411+442
1105	9537_220_5312_35_4397	220.531250	35.439722	9537	MARK 478
1106	10189_239_79_35_0297	239.790000	35.029722	10189	MARK 493
1107	9640_222_7867_27_1575	222.786667	27.157500	9640	PG 1448+273
1108	4641_125_6533_54_3103	125.653333	54.310278	4641	MS 08188+5428
1109	3610_53_4154_-5_0894	53.415417	-5.089444	3610	NGC 1358
1110	5571_153_7288_0_5603	153.728750	0.560278	5571	PG 1012+008
1111	7228_186_4538_33_5469	186.453750	33.546944	7228	NGC 4395
1112	6963_183_5738_14_0536	183.573750	14.053611	6963	PG 1211+143
1113	6649_177_8354_54_6258	177.835417	54.625833	6649	PG 1148+549
1114	6306_170_4462_11_7386	170.446250	11.738611	6306	MARK 734

	redsh	Vmag	Radio Fl	X Fl(mJ	Class	\
0	0.017	11.9	47261.0	17.514	Radio Galaxy radio l	
1	0.018	11.9	47200.0	17.514	Radio Galaxy radio l	
2	0.017	11.9	46310.0	17.514	Radio Galaxy radio l	
3	0.860	16.1	23261.0	1.033	QSO radio loud flat	
4	0.860	16.1	23261.0	1.033	QSO radio loud flat	
5	0.860	16.1	23261.0	1.033	QSO radio loud flat	
6	1.936	18.0	12366.0	0.172	QSO radio loud flat	
7	1.936	16.8	12366.0	0.172	QSO radio loud flat	
8	0.055	15.0	9290.0	2.087	BL Lac	
9	0.055	14.6	9290.0	2.087	BL Lac	
10	0.055	14.6	9290.0	2.087	BL Lac	
11	0.699	17.9	8894.0	0.316	QSO radio loud flat	
12	1.187	16.9	7262.0	0.261	QSO radio loud flat	
13	2.852	18.8	7013.0	0.185	QSO radio loud flat	
14	2.852	18.8	7013.0	0.185	QSO radio loud flat	
15	0.461	20.1	6600.0	0.079	Radio Galaxy radio l	
16	1.187	16.9	6570.0	0.261	QSO radio loud flat	
17	0.461	20.2	6487.0	0.079	Radio Galaxy radio l	
18	0.461	20.1	6480.0	0.079	Radio Galaxy radio l	

```
19    0.183  18.4   6454.0   0.000   Radio Galaxy radio q
20    0.691  16.8   6184.0   0.652   QSO radio loud steep
21    0.691  16.8   6184.0   0.652   QSO radio loud steep
22    0.691  16.8   6184.0   0.652   QSO radio loud steep
23    0.691  16.8   6184.0   0.652   QSO radio loud steep
24    2.365  17.7   5425.0   0.380    QSO radio loud flat
25    0.367  16.2   5378.0   0.925   QSO radio loud steep
26    0.367  16.2   5378.0   0.925   QSO radio loud steep
27    0.990  16.5   4570.0   0.907    QSO radio loud flat
28    0.990  16.5   4570.0   0.907    QSO radio loud flat
29    0.990  16.5   4570.0   0.907    QSO radio loud flat
...    ...   ...     ...     ...                      ...
1085  0.177  14.7      3.0   0.390          Seyfert type 1
1086  0.061  14.0      3.0   2.267          Seyfert type 1
1087  0.434  16.9      3.0   0.134          QSO radio quiet
1088  2.546  16.7      2.0   0.003          QSO radio quiet
1089  0.009  13.1      2.0   2.532          Seyfert type 1
1090  0.300  18.0      2.0   0.357   QSO radio loud steep
1091  0.008  11.8      2.0   0.000          Seyfert type 2
1092  0.056  14.6      2.0   0.038          Seyfert type 1
1093  0.201  17.1      2.0   0.000          Seyfert type 1
1094  0.036  15.4      2.0   5.360          Seyfert type 1
1095  0.063  14.6      2.0   2.815          Seyfert type 1
1096  0.003  10.8      2.0   0.001          Seyfert type 2
1097  0.155  15.4      2.0   0.675          QSO radio quiet
1098  0.339  20.0      1.0   0.060                  BL Lac
1099  0.317  17.5      1.0   0.169          QSO radio quiet
1100  0.199  18.3      1.0   0.000          Seyfert type 1
1101  0.164  15.0      1.0   0.522          Seyfert type 1
1102  0.055  15.4      1.0   0.154          Seyfert type 1
1103  0.003  13.1      1.0   0.039          Seyfert type 1
1104  0.089  14.4      1.0   0.007          Seyfert type 1
1105  0.077  14.6      1.0   0.809          Seyfert type 1
1106  0.031  15.1      1.0   0.290          Seyfert type 1
1107  0.065  14.4      1.0   1.420          Seyfert type 1
1108  0.086  16.5      1.0   0.230          Seyfert type 1
1109  0.013  13.1      1.0   0.000          Seyfert type 2
1110  0.185  15.6      1.0   0.685          Seyfert type 1
1111  0.001  10.1      1.0   0.006          Seyfert type 1
1112  0.085  14.2      1.0   1.006          Seyfert type 1
1113  0.978  15.8      1.0   0.047          QSO radio quiet
1114  0.049  14.9      1.0   0.578          Seyfert type 1

                        ids                       filenames
0        3535_49_9504_41_5117    49_95067_41_51169_sedtool.txt
1        3536_49_9504_41_5117    49_95067_41_51169_sedtool.txt
2        3537_49_9504_41_5117    49_95067_41_51169_sedtool.txt
3    12799_343_4904_16_1481  343_49042_16_14817_sedtool.txt
```

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4        12798_343_4904_16_1481      343_49042_16_14817_sedtool.txt
5        12797_343_4904_16_1481      343_49042_16_14817_sedtool.txt
6        11775_324_1604_0_6983       324_16074_0_69843_sedtool.txt
7        11776_324_1604_0_6983       324_16074_0_69843_sedtool.txt
8        4187_80_7413_-36_4583       80_74179_m36_45833_sedtool.txt
9        4189_80_7413_-36_4583       80_74179_m36_45833_sedtool.txt
10       4188_80_7413_-36_4583       80_74179_m36_45833_sedtool.txt
11       5121_141_7625_39_0392       141_76260_39_03909_sedtool.txt
12       6370_172_5292_-14_8242      172_52938_m14_82422_sedtool.txt
13       3992_70_0712_-43_5522       70_07112_m43_55250_sedtool.txt
14       3994_70_0717_-43_5525       70_07112_m43_55250_sedtool.txt
15       9229_212_8354_52_2022       212_83580_52_20264_sedtool.txt
16       6371_172_5292_-14_8242      172_52938_m14_82422_sedtool.txt
17       9227_212_8354_52_2025       212_83580_52_20264_sedtool.txt
18       9228_212_8354_52_2022       212_83580_52_20264_sedtool.txt
19    11096_294_8542_-63_7128        294_85454_m63_71267_sedtool.txt
20       10984_277_3821_48_7461      277_38250_48_74631_sedtool.txt
21       10985_277_3821_48_7461      277_38250_48_74631_sedtool.txt
22       10986_277_3821_48_7461      277_38250_48_74631_sedtool.txt
23       10987_277_3825_48_7461      277_38250_48_74631_sedtool.txt
24       4260_88_8783_39_8136        88_87833_39_81350_sedtool.txt
25       2290_24_4217_33_1597        24_42196_33_15989_sedtool.txt
26       2291_24_4217_33_1597        24_42196_33_15989_sedtool.txt
27       11952_327_0229_6_9608       327_02276_6_96073_sedtool.txt
28       11951_327_0225_6_9606       327_02276_6_96073_sedtool.txt
29       11950_327_0225_6_9606       327_02276_6_96073_sedtool.txt
...              ...                         ...
1085     6285_169_7867_21_3217       169_78622_21_32159_sedtool.txt
1086      994_13_3954_12_6933        13_39550_12_69330_sedtool.txt
1087     9152_211_0442_9_6294        211_04413_9_62929_sedtool.txt
1088     9258_213_9429_11_4956       213_94272_11_49547_sedtool.txt
1089     7581_189_9142_-5_3442       189_91435_m5_34422_sedtool.txt
1090       99_1_8629_2_6867          1_86280_2_68698_sedtool.txt
1091     9042_208_3242_33_4908       208_32415_33_49084_sedtool.txt
1092     4402_108_5629_45_6989       108_56290_45_69881_sedtool.txt
1093     8442_201_0829_5_6181        201_08292_5_61806_sedtool.txt
1094     5106_141_3037_52_2864       141_30349_52_28623_sedtool.txt
1095     11683_323_1158_10_1386      323_11581_10_13871_sedtool.txt
1096     6719_179_1171_55_125        179_11730_55_12529_sedtool.txt
1097     2674_31_9575_2_7153         31_95783_2_71542_sedtool.txt
1098     2070_21_1854_9_3136         21_18550_9_31369_sedtool.txt
1099       94_1_7917_0_8914          1_79171_0_89127_sedtool.txt
1100     9212_212_7062_1_8594        212_70638_1_85964_sedtool.txt
1101     9162_211_3175_25_9261       211_31748_25_92637_sedtool.txt
1102     9055_208_5267_23_4303       208_52677_23_43033_sedtool.txt
1103     8822_205_5346_35_6542       205_53478_35_65429_sedtool.txt
1104     9243_213_4512_44_0039       213_45139_44_00386_sedtool.txt
1105     9537_220_5312_35_4397       220_53114_35_43973_sedtool.txt
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1106        10189_239_79_35_0297        239_79012_35_02993_sedtool.txt
1107        9640_222_7867_27_1575       222_78669_27_15743_sedtool.txt
1108        4641_125_6533_54_3103       125_65339_54_31012_sedtool.txt
1109        3610_53_4154_-5_0894         53_41562_m5_08956_sedtool.txt
1110        5571_153_7288_0_5603         153_72879_0_56026_sedtool.txt
1111        7228_186_4538_33_5469       186_45382_33_54680_sedtool.txt
1112        6963_183_5738_14_0536       183_57348_14_05336_sedtool.txt
1113        6649_177_8354_54_6258       177_83515_54_62583_sedtool.txt
1114        6306_170_4462_11_7386       170_44615_11_73852_sedtool.txt

[1115 rows x 12 columns]
```

1.4 Check a SED

In [27]: i = 137

agns_results.iloc[i]

Out[27]: label   11137_299_4992_-38_7517
        RA   299.499
        DEC   -38.7517
        ID   11137
        Name   PKS 1954-388
        redsh   0.63
        Vmag   17.5
        Radio Fl   2000
        X Fl(mJ   0
        Class   QSO radio loud flat
        ids   11137_299_4992_-38_7517
        filenames   299_49917_m38_75194_sedtool.txt
        Name: 137, dtype: object

In [28]: filename = agns_results.iloc[i].filenames

        ffname = 'work/AGN_all_radio_non_null/Results/SEDtool/{!s}'.format(filename)
        %cat $ffname

299.49917 | -38.75194 | 8.430E+08 | 1.000E+00 | 1.192E-14 | 3.600E-16 | 55000.00 | 5500
299.49917 | -38.75194 | 2.418E+17 | 1.000E+00 | 1.469E-12 | 5.590E-13 | 55000.00 | 5500
299.49917 | -38.75194 | 2.418E+17 | 1.000E+00 | 6.228E-13 | 2.762E-13 | 55000.00 | 5500
299.49917 | -38.75194 | 2.418E+17 | 1.000E+00 | 1.575E-12 | 5.215E-13 | 55000.00 | 5500
299.49917 | -38.75194 | 2.418E+17 | 1.000E+00 | 7.728E-13 | 3.920E-14 | 55000.00 | 5500
299.49917 | -38.75194 | 2.660E+17 | 1.000E+00 | 1.128E-12 | 4.834E-13 | 55000.00 | 5500
299.49917 | -38.75194 | 2.660E+17 | 1.000E+00 | 1.459E-12 | 5.118E-13 | 55000.00 | 5500
299.49917 | -38.75194 | 1.572E+17 | 1.000E+00 | 6.668E-13 | 6.035E-14 | 55000.00 | 5500
299.49917 | -38.75194 | 3.627E+17 | 1.000E+00 | 8.231E-13 | 6.870E-14 | 55000.00 | 5500
299.49917 | -38.75194 | 1.451E+18 | 1.000E+00 | 9.281E-13 | 8.895E-14 | 55000.00 | 5500
299.49917 | -38.75194 | 1.400E+09 | 1.000E+00 | 2.091E-14 | 6.250E-16 | 55000.00 | 5500
299.49917 | -38.75194 | 5.000E+09 | 1.000E+00 | 2.035E-13 | 1.010E-14 | 55000.00 | 5500

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299.49917 | -38.75194 |   8.000E+09 |  1.000E+00 |   3.410E-13 |  1.775E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   2.000E+10 |  1.000E+00 |   7.512E-13 |  3.120E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   4.800E+09 |  1.000E+00 |   1.088E-13 |  1.750E-15 |   55000.00 |   5500
299.49917 | -38.75194 |   8.600E+09 |  1.000E+00 |   2.289E-13 |  1.035E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   4.800E+09 |  1.000E+00 |   9.331E-14 |  4.870E-15 |   55000.00 |   5500
299.49917 | -38.75194 |   1.000E+11 |  1.000E+00 |   1.555E-12 |  6.000E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   1.430E+11 |  1.000E+00 |   1.871E-12 |  6.250E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   2.170E+11 |  1.000E+00 |   2.330E-12 |  7.350E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   4.400E+10 |  1.000E+00 |   7.873E-13 |  6.575E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   7.000E+10 |  1.000E+00 |   1.134E-12 |  8.450E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   1.389E+14 |  1.000E+00 |   2.015E-12 |  1.375E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   1.804E+14 |  1.000E+00 |   1.865E-12 |  1.150E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   2.427E+14 |  1.000E+00 |   1.703E-12 |  9.900E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   8.817E+13 |  1.000E+00 |   4.555E-12 |  9.650E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   6.517E+13 |  1.000E+00 |   5.339E-12 |  9.850E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   2.498E+13 |  1.000E+00 |   3.773E-12 |  7.650E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   1.363E+13 |  1.000E+00 |   5.252E-12 |  2.130E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   4.455E+14 |  1.000E+00 |   2.492E-12 |  0.000E+00 |   55000.00 |   5500
299.49917 | -38.75194 |   1.948E+15 |  1.000E+00 |   1.964E-12 |  1.930E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   1.295E+15 |  1.000E+00 |   4.018E-12 |  1.670E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   1.344E+15 |  1.000E+00 |   4.534E-12 |  2.850E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   1.477E+15 |  1.000E+00 |   2.784E-12 |  1.535E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   8.563E+14 |  1.000E+00 |   2.819E-12 |  2.150E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   8.563E+14 |  1.000E+00 |   3.611E-12 |  1.790E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   6.925E+14 |  1.000E+00 |   3.323E-12 |  1.905E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   5.550E+14 |  1.000E+00 |   2.759E-12 |  2.595E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   1.138E+15 |  1.000E+00 |   4.149E-12 |  1.915E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   1.344E+15 |  1.000E+00 |   4.862E-12 |  2.595E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   1.477E+15 |  1.000E+00 |   4.712E-12 |  1.660E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   2.418E+23 |  1.000E+00 |   5.935E-12 |  3.230E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   4.835E+22 |  1.000E+00 |   1.168E-11 |  7.450E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   1.451E+23 |  1.000E+00 |   8.733E-12 |  4.705E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   4.835E+23 |  1.000E+00 |   6.192E-12 |  4.520E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   1.451E+24 |  1.000E+00 |   2.767E-12 |  4.275E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   1.451E+25 |  1.000E+00 |   4.487E-13 |  2.601E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   1.209E+25 |  1.000E+00 |   1.662E-13 |  6.760E-14 |   55000.00 |   5500
299.49917 | -38.75194 |   3.627E+24 |  1.000E+00 |   6.914E-13 |  3.052E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   8.462E+24 |  1.000E+00 |   1.379E-19 |  4.052E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   2.418E+25 |  1.000E+00 |   2.969E-13 |  3.053E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   7.253E+25 |  1.000E+00 |   5.152E-18 |  1.808E-12 |   55000.00 |   5500
299.49917 | -38.75194 |   2.418E+26 |  1.000E+00 |   1.034E-21 |  6.385E-12 |   55000.00 |   5500
299.49917 | -38.75194 |   1.209E+23 |  1.000E+00 |   1.000E-11 |  3.370E-13 |   55000.00 |   5500
299.49917 | -38.75194 |   1.209E+25 |  1.000E+00 |   1.488E-12 |  5.000E-14 |   55000.00 |   5500
```

In [29]: ffname

Out[29]: 'work/AGN_all_radio_non_null/Results/SEDtool/299_49917_m38_75194_sedtool.txt'

```
In [30]: df_sed = pd.read_csv(ffname, sep='|', names=['ra','dec','freq','dfreq','flux','dflux'

         df_sed

Out[30]:             ra        dec          freq  dfreq          flux         dflux  \
         0    299.49917  -38.75194  8.430000e+08    1.0  1.192000e-14  3.600000e-16
         1    299.49917  -38.75194  2.418000e+17    1.0  1.469000e-12  5.590000e-13
         2    299.49917  -38.75194  2.418000e+17    1.0  6.228000e-13  2.762000e-13
         3    299.49917  -38.75194  2.418000e+17    1.0  1.575000e-12  5.215000e-13
         4    299.49917  -38.75194  2.418000e+17    1.0  7.728000e-13  3.920000e-14
         5    299.49917  -38.75194  2.660000e+17    1.0  1.128000e-12  4.834000e-13
         6    299.49917  -38.75194  2.660000e+17    1.0  1.459000e-12  5.118000e-13
         7    299.49917  -38.75194  1.572000e+17    1.0  6.668000e-13  6.035000e-14
         8    299.49917  -38.75194  3.627000e+17    1.0  8.231000e-13  6.870000e-14
         9    299.49917  -38.75194  1.451000e+18    1.0  9.281000e-13  8.895000e-14
         10   299.49917  -38.75194  1.400000e+09    1.0  2.091000e-14  6.250000e-16
         11   299.49917  -38.75194  5.000000e+09    1.0  2.035000e-13  1.010000e-14
         12   299.49917  -38.75194  8.000000e+09    1.0  3.410000e-13  1.775000e-14
         13   299.49917  -38.75194  2.000000e+10    1.0  7.512000e-13  3.120000e-14
         14   299.49917  -38.75194  4.800000e+09    1.0  1.088000e-13  1.750000e-15
         15   299.49917  -38.75194  8.600000e+09    1.0  2.289000e-13  1.035000e-14
         16   299.49917  -38.75194  4.800000e+09    1.0  9.331000e-14  4.870000e-15
         17   299.49917  -38.75194  1.000000e+11    1.0  1.555000e-12  6.000000e-14
         18   299.49917  -38.75194  1.430000e+11    1.0  1.871000e-12  6.250000e-14
         19   299.49917  -38.75194  2.170000e+11    1.0  2.330000e-12  7.350000e-14
         20   299.49917  -38.75194  4.400000e+10    1.0  7.873000e-13  6.575000e-14
         21   299.49917  -38.75194  7.000000e+10    1.0  1.134000e-12  8.450000e-14
         22   299.49917  -38.75194  1.389000e+14    1.0  2.015000e-12  1.375000e-13
         23   299.49917  -38.75194  1.804000e+14    1.0  1.865000e-12  1.150000e-13
         24   299.49917  -38.75194  2.427000e+14    1.0  1.703000e-12  9.900000e-14
         25   299.49917  -38.75194  8.817000e+13    1.0  4.555000e-12  9.650000e-14
         26   299.49917  -38.75194  6.517000e+13    1.0  5.339000e-12  9.850000e-14
         27   299.49917  -38.75194  2.498000e+13    1.0  3.773000e-12  7.650000e-14
         28   299.49917  -38.75194  1.363000e+13    1.0  5.252000e-12  2.130000e-13
         29   299.49917  -38.75194  4.455000e+14    1.0  2.492000e-12  0.000000e+00
         30   299.49917  -38.75194  1.948000e+15    1.0  1.964000e-12  1.930000e-13
         31   299.49917  -38.75194  1.295000e+15    1.0  4.018000e-12  1.670000e-13
         32   299.49917  -38.75194  1.344000e+15    1.0  4.534000e-12  2.850000e-13
         33   299.49917  -38.75194  1.477000e+15    1.0  2.784000e-12  1.535000e-13
         34   299.49917  -38.75194  8.563000e+14    1.0  2.819000e-12  2.150000e-14
         35   299.49917  -38.75194  8.563000e+14    1.0  3.611000e-12  1.790000e-13
         36   299.49917  -38.75194  6.925000e+14    1.0  3.323000e-12  1.905000e-13
         37   299.49917  -38.75194  5.550000e+14    1.0  2.759000e-12  2.595000e-13
         38   299.49917  -38.75194  1.138000e+15    1.0  4.149000e-12  1.915000e-13
         39   299.49917  -38.75194  1.344000e+15    1.0  4.862000e-12  2.595000e-13
         40   299.49917  -38.75194  1.477000e+15    1.0  4.712000e-12  1.660000e-13
         41   299.49917  -38.75194  2.418000e+23    1.0  5.935000e-12  3.230000e-13
         42   299.49917  -38.75194  4.835000e+22    1.0  1.168000e-11  7.450000e-13
```

```
43  299.49917 -38.75194  1.451000e+23   1.0  8.733000e-12  4.705000e-13
44  299.49917 -38.75194  4.835000e+23   1.0  6.192000e-12  4.520000e-13
45  299.49917 -38.75194  1.451000e+24   1.0  2.767000e-12  4.275000e-13
46  299.49917 -38.75194  1.451000e+25   1.0  4.487000e-13  2.601000e-13
47  299.49917 -38.75194  1.209000e+25   1.0  1.662000e-13  6.760000e-14
48  299.49917 -38.75194  3.627000e+24   1.0  6.914000e-13  3.052000e-13
49  299.49917 -38.75194  8.462000e+24   1.0  1.379000e-19  4.052000e-13
50  299.49917 -38.75194  2.418000e+25   1.0  2.969000e-13  3.053000e-13
51  299.49917 -38.75194  7.253000e+25   1.0  5.152000e-18  1.808000e-12
52  299.49917 -38.75194  2.418000e+26   1.0  1.034000e-21  6.385000e-12
53  299.49917 -38.75194  1.209000e+23   1.0  1.000000e-11  3.370000e-13
54  299.49917 -38.75194  1.209000e+25   1.0  1.488000e-12  5.000000e-14

          mjd      dmjd   UL   UNK
0     55000.0   55000.0        NaN
1     55000.0   55000.0        NaN
2     55000.0   55000.0        NaN
3     55000.0   55000.0        NaN
4     55000.0   55000.0        NaN
5     55000.0   55000.0        NaN
6     55000.0   55000.0        NaN
7     55000.0   55000.0        NaN
8     55000.0   55000.0        NaN
9     55000.0   55000.0        NaN
10    55000.0   55000.0        NaN
11    55000.0   55000.0        NaN
12    55000.0   55000.0        NaN
13    55000.0   55000.0        NaN
14    55000.0   55000.0        NaN
15    55000.0   55000.0        NaN
16    55000.0   55000.0        NaN
17    55000.0   55000.0        NaN
18    55000.0   55000.0        NaN
19    55000.0   55000.0        NaN
20    55000.0   55000.0        NaN
21    55000.0   55000.0        NaN
22    55000.0   55000.0        NaN
23    55000.0   55000.0        NaN
24    55000.0   55000.0        NaN
25    55000.0   55000.0        NaN
26    55000.0   55000.0        NaN
27    55000.0   55000.0        NaN
28    55000.0   55000.0        NaN
29    55000.0   55000.0        NaN
30    55000.0   55000.0        NaN
31    55000.0   55000.0        NaN
32    55000.0   55000.0        NaN
33    55000.0   55000.0        NaN
```

```
34  55000.0  55000.0        NaN
35  55000.0  55000.0        NaN
36  55000.0  55000.0        NaN
37  55000.0  55000.0        NaN
38  55000.0  55000.0        NaN
39  55000.0  55000.0        NaN
40  55000.0  55000.0        NaN
41  55000.0  55000.0        NaN
42  55000.0  55000.0        NaN
43  55000.0  55000.0        NaN
44  55000.0  55000.0        NaN
45  55000.0  55000.0        NaN
46  55000.0  55000.0        NaN
47  55000.0  55000.0        NaN
48  55000.0  55000.0        NaN
49  55000.0  55000.0    UL  NaN
50  55000.0  55000.0        NaN
51  55000.0  55000.0    UL  NaN
52  55000.0  55000.0    UL  NaN
53  55000.0  55000.0        NaN
54  55000.0  55000.0        NaN
```

```python
In [31]: import matplotlib
         %matplotlib inline
         from matplotlib import pyplot as plt

         import numpy as np
         x = np.log10(df_sed['freq'])
         y = np.log10(df_sed['flux'])
         #y = df_sed['flux']

         plt.plot(x, y, 'b*')
         plt.grid(True)
```