In [1]:
```
import matplotlib.pyplot as plt
from astropy.visualization import astropy_mpl_style

plt.style.use(astropy_mpl_style)
```

In [2]:
```
from astropy.io import fits
from astropy.utils.data import get_pkg_data_filename

image_file = get_pkg_data_filename('/home/sagarika/belgrade/agn/mass-
```

In [3]:
```
file=fits.open(image_file)
```

In [4]:
```
file.info()
```

```
Filename: /home/sagarika/belgrade/agn/mass-agn-main/spec-1943-53386
-0466.fits
No.    Name      Ver    Type      Cards   Dimensions   Format
  0  PRIMARY       1 PrimaryHDU     139   ()
  1  COADD         1 BinTableHDU     26   3848R x 8C   [E, E, E, J,
J, E, E, E]
  2  SPECOBJ       1 BinTableHDU    262   1R x 126C   [6A, 4A, 16A,
23A, 16A, 8A, E, E, E, J, E, E, J, B, B, B, B, B, B, J, 22A, 19A, 1
9A, 22A, 19A, I, 3A, 3A, 1A, J, D, D, D, E, E, 19A, 8A, J, J, J, J,
K, K, J, J, J, J, J, J, K, K, K, K, I, J, J, J, J, 5J, D, D, 6A, 21
A, E, E, E, J, E, 24A, 10J, J, 10E, E, E, E, E, E, E, J, E, E, E,
J, E, 5E, E, 10E, 10E, 10E, 5E, 5E, 5E, 5E, 5E, J, J, E, E, E, E,
E, E, 25A, 21A, 10A, E, E, E, E, E, E, E, E, J, E, E, J, 1A, 1A, E,
E, J, J, 1A, 5E, 5E]
  3  SPZLINE       1 BinTableHDU     48   29R x 19C   [J, J, J, 13
A, D, E, E, E, E, E, E, E, E, E, E, J, J, E, E]
```

In [5]:
```
file[0].header
```

Out[5]:
```
SIMPLE  =                    T / conforms to FITS standard
BITPIX  =                    8 / array data type
NAXIS   =                    0 / number of array dimensions
EXTEND  =                    T
TAI     =        4612589967.58 / 1st row - Number of seconds since
Nov 17 1858
RA      =           144.58020 / 1st row - Right ascension of teles
cope boresigh
DEC     =           32.577849 / 1st row - Declination of telescope
boresight (d
EQUINOX =              2000.00 /
RADECSYS= 'FK5     '           /
TAIHMS  = '10:40:51.57'        / 1st row - TAI time (HH:MM:SS.SS)
(TAI-UT = appr
TIMESYS = 'tai     '           / TAI, not UTC
MJD     =                53386 / MJD of observation
MJDLIST = '53386   '           /
VERSION = 'v3_143_0'           / version of IOP
CAMVER  = 'SPEC1 v4_8'         / Camera code version
OBSERVER= 'apo     '           /
```

In [6]:
```
file[1].data
```

Out[6]:
```
FITS_rec([(193.82727 , 3.5795, 0.02344635, 0,        0, 1.1445682 ,
6.051068 , 168.88173 ),
          (178.00491 , 3.5796, 0.0253348 , 0,        0, 1.1442283 ,
5.7337284, 168.84167 ),
          (179.91849 , 3.5797, 0.02549019, 0,        0, 1.143889  ,
5.4587855, 169.11548 ),
          ...,
          ( 46.999905, 3.964 , 0.20024602, 0, 33554432, 0.63956815,
3.175484 ,  45.529568),
          ( 48.799263, 3.9641, 0.18671538, 0, 33554432, 0.6395872 ,
3.5138826,  46.730247),
          ( 48.6817  , 3.9642, 0.23733607, 0,        0, 0.63960457,
4.076221 ,  47.343994)],
         dtype=(numpy.record, [('flux', '>f4'), ('loglam', '>f4'),
('ivar', '>f4'), ('and_mask', '>i4'), ('or_mask', '>i4'), ('wdisp',
'>f4'), ('sky', '>f4'), ('model', '>f4')]))
```

In [7]:
```
flux=file[1].data['flux']
flux
```

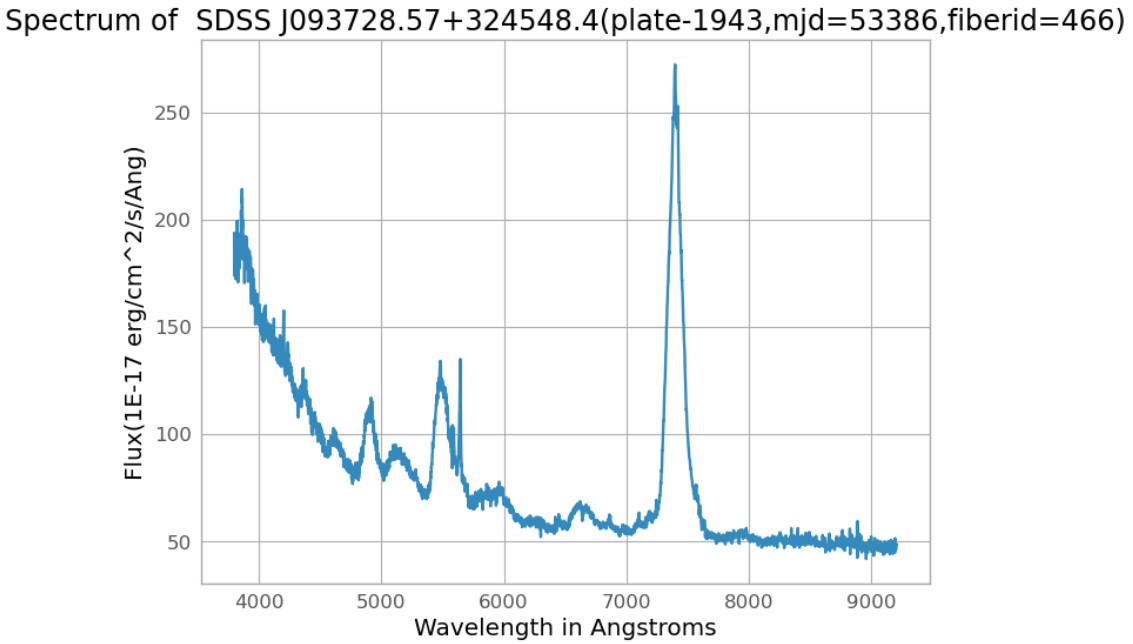
Out[7]:
```
array([193.82727 , 178.00491 , 179.91849 , ...,  46.999905,  48.799
263,
        48.6817  ], dtype=float32)
```

In [8]:
```
wavelength=file[1].data['loglam']  # given in log scale and hence put
wavelength
```

Out[8]:
```
array([3.5795, 3.5796, 3.5797, ..., 3.964 , 3.9641, 3.9642], dtype=
float32)
```

In [9]:
```
plt.plot(10**wavelength,flux)
plt.title("Spectrum of  SDSS J093728.57+324548.4(plate-1943,mjd=53386
plt.xlabel("Wavelength in Angstroms")
plt.ylabel("Flux(1E-17 erg/cm^2/s/Ang)")
```

Out[9]:
```
Text(0, 0.5, 'Flux(1E-17 erg/cm^2/s/Ang)')
```



In [10]:
```
from astropy.io import fits
from astropy.utils.data import get_pkg_data_filename

image_file2 = get_pkg_data_filename('/home/sagarika/belgrade/agn/mass
```

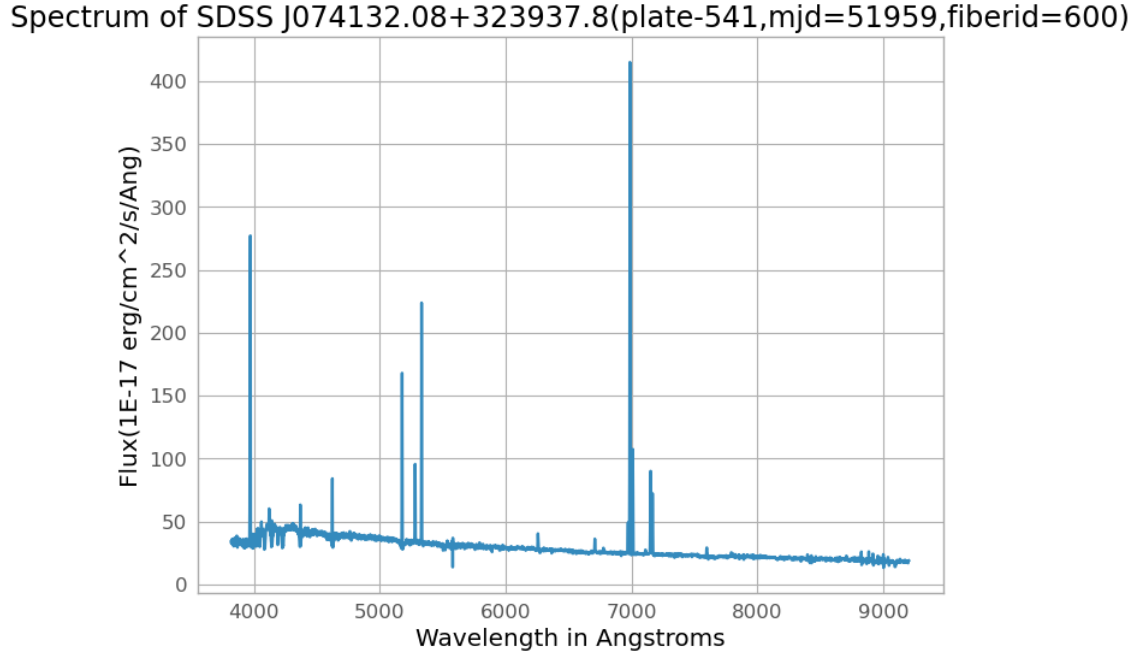
In [11]:
```
file2=fits.open(image_file2)
file2[1].data
```

Out[11]:
```
FITS_rec([(33.994324, 3.5817, 0.12753314, 0, 0, 1.089062 ,  7.29963
87, 20.400211),
          (33.249973, 3.5818, 0.2572506 , 0, 0, 1.0564605, 10.55308
7 , 17.805681),
          (32.666393, 3.5819, 0.25874358, 0, 0, 1.058272 , 10.05327
9 , 19.856388),
          ...,
          (18.589901, 3.9638, 1.7497382 , 0, 0, 0.691574 ,  4.53403
7 , 18.820028),
          (18.587715, 3.9639, 1.7420136 , 0, 0, 0.6914561,  4.46839
7 , 19.103128),
          (18.778645, 3.964 , 1.6630418 , 0, 0, 0.691655 ,  4.39207
12, 18.767086)],
         dtype=(numpy.record, [('flux', '>f4'), ('loglam', '>f4'),
('ivar', '>f4'), ('and_mask', '>i4'), ('or_mask', '>i4'), ('wdisp',
'>f4'), ('sky', '>f4'), ('model', '>f4')]))
```

In [12]:
```
flux2=file2[1].data['flux']
wavelength2=file2[1].data['loglam']
```

In [13]:
```
plt.plot(10**wavelength2,flux2)
plt.title("Spectrum of SDSS J074132.08+323937.8(plate-541,mjd=51959,f
plt.xlabel("Wavelength in Angstroms")
plt.ylabel("Flux(1E-17 erg/cm^2/s/Ang)")
```

Out[13]:
```
Text(0, 0.5, 'Flux(1E-17 erg/cm^2/s/Ang)')
```



In [14]:
```
from astropy.io import fits
from astropy.utils.data import get_pkg_data_filename

image_file3 = get_pkg_data_filename('/home/sagarika/belgrade/agn/mass
```

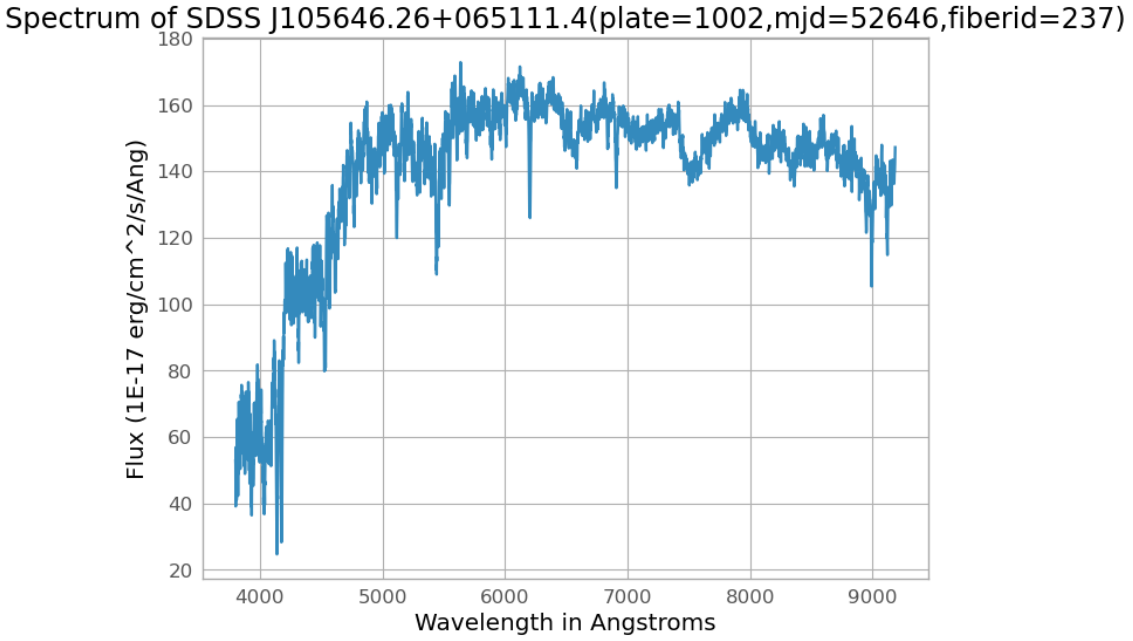
In [15]:
```
file3=fits.open(image_file3)
file3[1].data
```

Out[15]:
```
FITS_rec([( 52.87362 , 3.58  , 0.0451862 , 0, 0, 1.3164771 , 5.3261
194,  49.140305),
          ( 51.619797, 3.5801, 0.04728214, 0, 0, 1.3161854 , 5.0247
35 ,  48.980503),
          ( 39.13661 , 3.5802, 0.05423677, 0, 0, 1.3158998 , 5.0017
28 ,  50.809116),
          ...,
          (139.99397 , 3.9628, 0.07082824, 0, 0, 0.63710684, 5.0409
39 , 136.70139 ),
          (142.70534 , 3.9629, 0.07321553, 0, 0, 0.63690794, 4.7480
94 , 138.78084 ),
          (147.23473 , 3.963 , 0.07182398, 0, 0, 0.63670945, 4.6882
734, 136.9379  )],
         dtype=(numpy.record, [('flux', '>f4'), ('loglam', '>f4'),
('ivar', '>f4'), ('and_mask', '>i4'), ('or_mask', '>i4'), ('wdisp',
'>f4'), ('sky', '>f4'), ('model', '>f4')]))
```

In [16]:
```
flux3=file3[1].data['flux']
wavelength3=file3[1].data['loglam']
```

In [17]:
```
plt.plot(10**wavelength3,flux3)
plt.title("Spectrum of SDSS J105646.26+065111.4(plate=1002,mjd=52646,
plt.xlabel("Wavelength in Angstroms")
plt.ylabel("Flux (1E-17 erg/cm^2/s/Ang)")
```

Out[17]:
```
Text(0, 0.5, 'Flux (1E-17 erg/cm^2/s/Ang)')
```



In [ ]: