



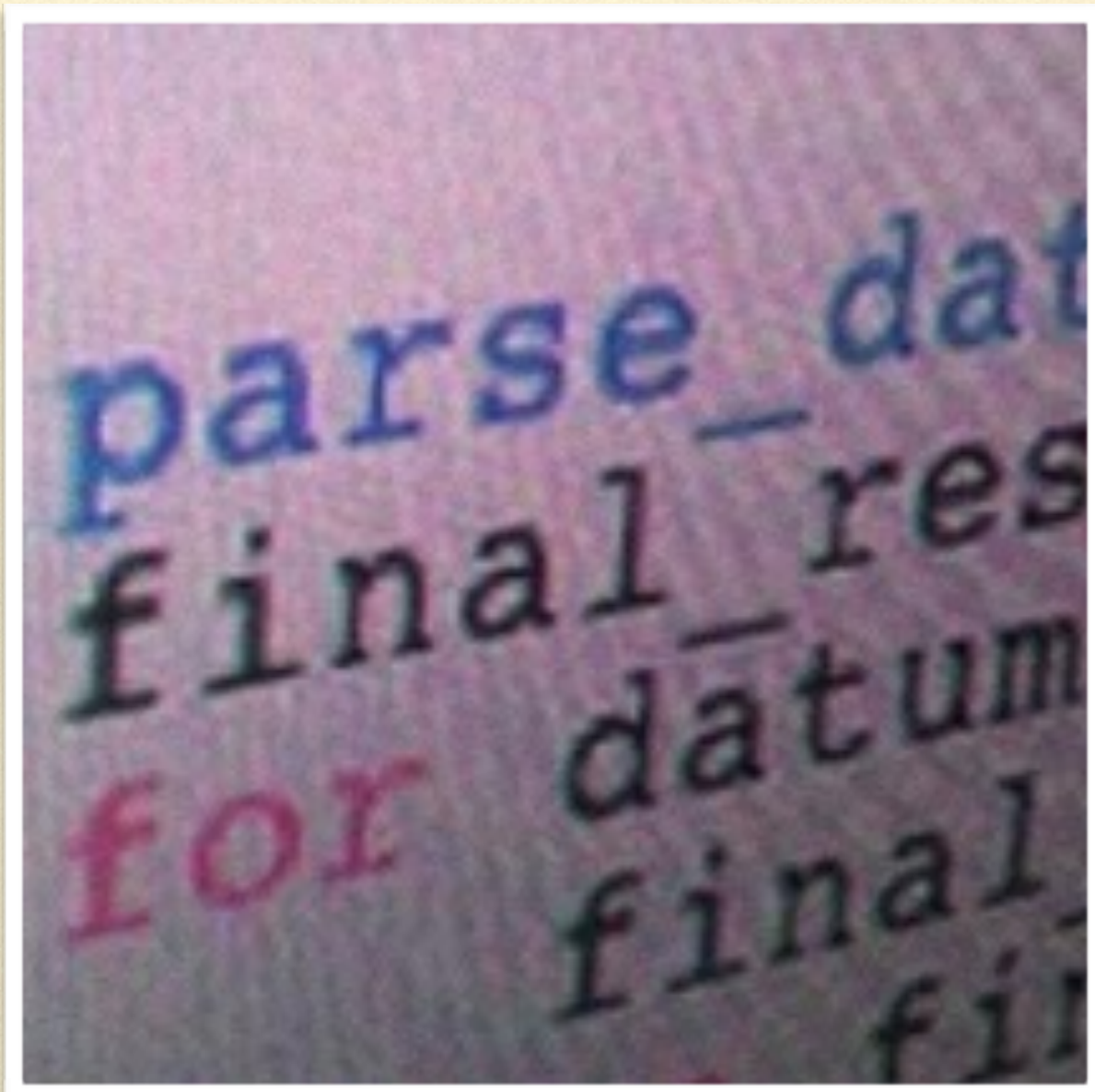
ASTROINFORMÁTICA I

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OBJETIVOS

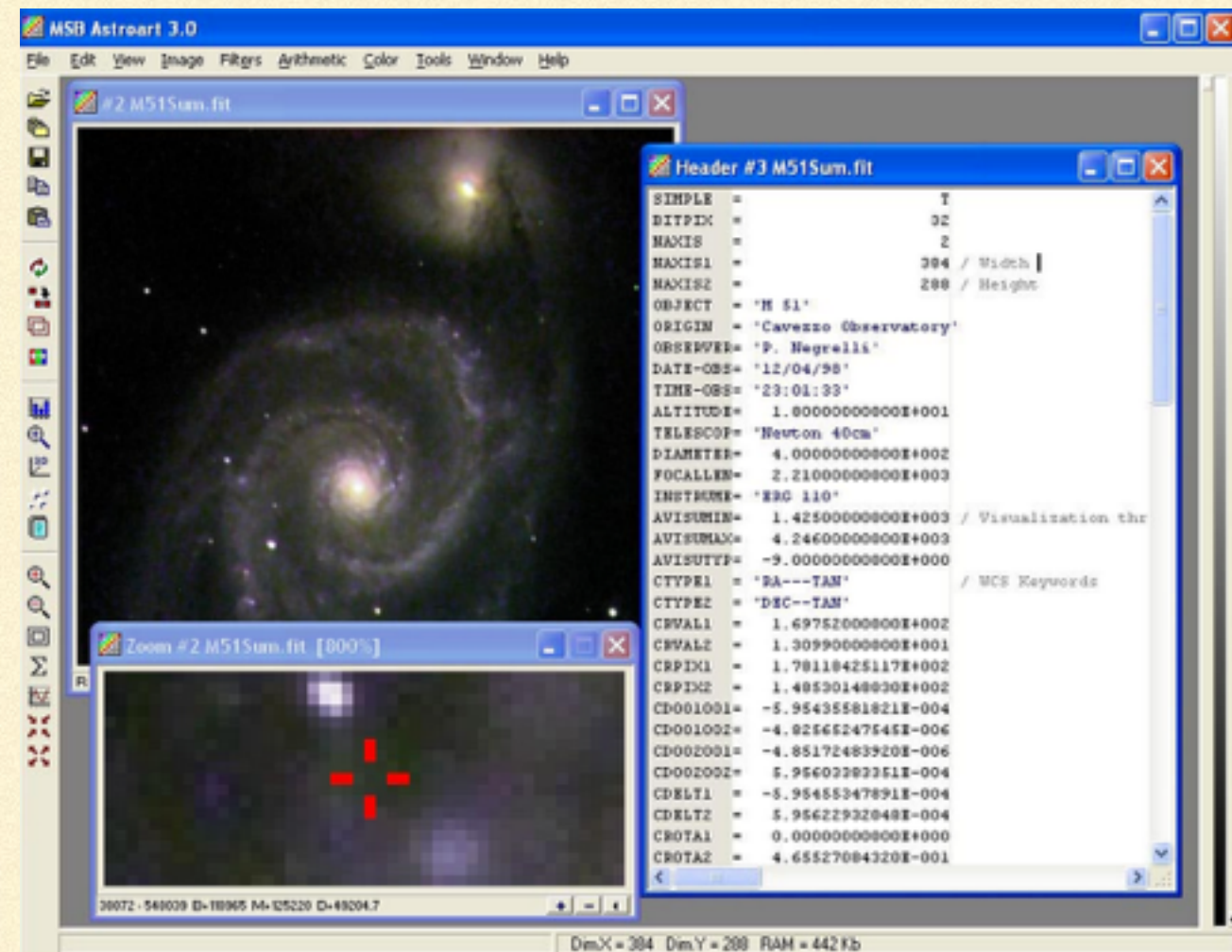


- Conhecer os fundamentos dos arquivos FITS
- Conhecer e praticar com o módulo pyFITS para acesso básico a headers e dados FITS

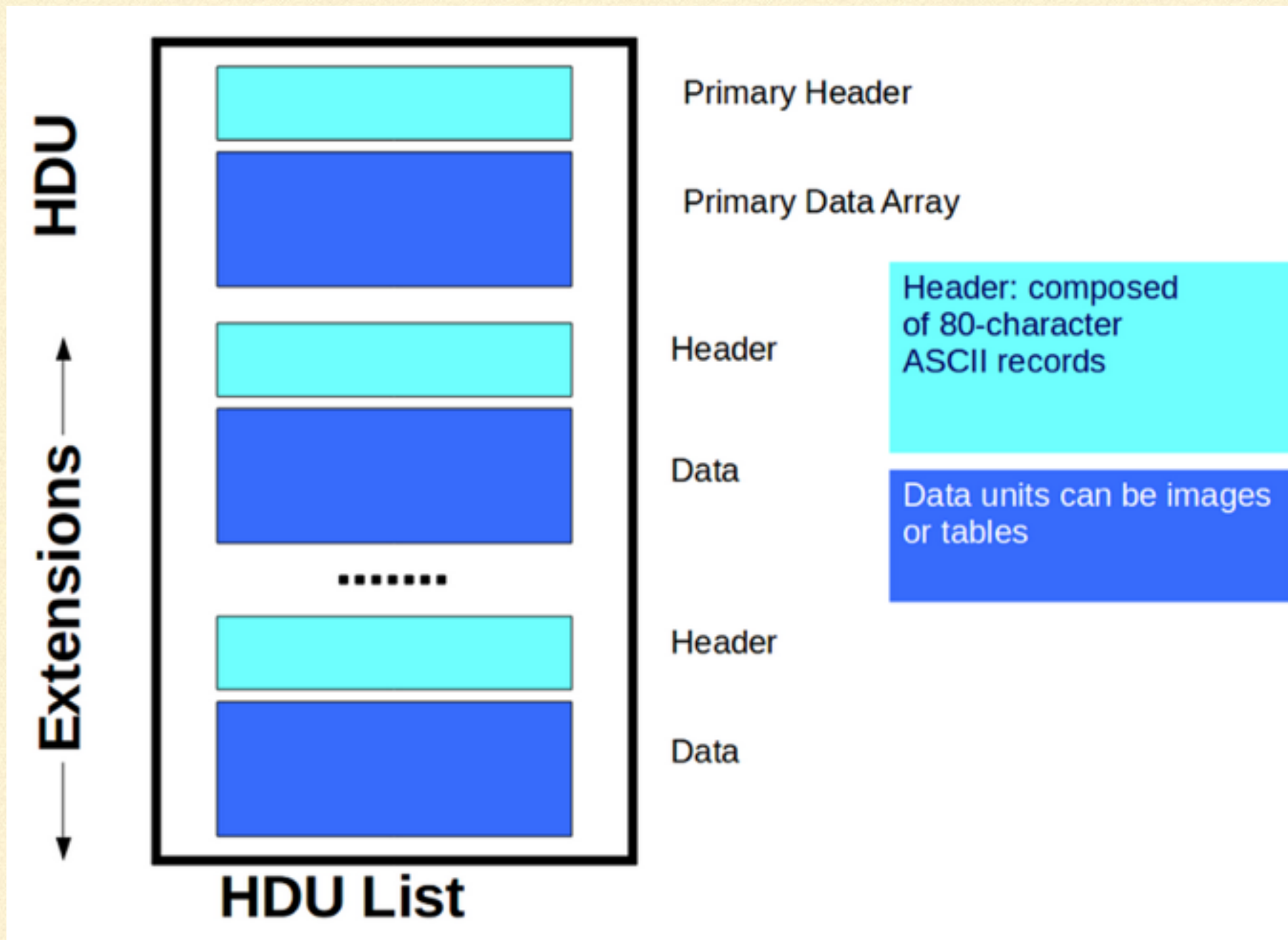
FITS

FITS (*Flexible Image Transport System*) é um formato de arquivo digital utilizado para armazenar, transmitir e manipular imagens/dados científicas.

Além dos dados brutos, o formato FITS permite incluir informações como calibração fotométrica e espacial.



FORMATO FITS



MÓDULO PYFITS

```
>>> import pyfits
```

```
>>> hdulist = pyfits.open('input.fits')
```

```
>>> hdulist.info()
Filename: test1.fits
No. Name      Type          Cards  Dimensions Format
0 PRIMARY PrimaryHDU    220    ()        int16
1 SCI        ImageHDU       61     (800, 800) float32
2 SCI        ImageHDU       61     (800, 800) float32
3 SCI        ImageHDU       61     (800, 800) float32
4 SCI        ImageHDU       61     (800, 800) float32
```

```
>>> hdulist.close()
```


HEADERS

```
>>> prihdr = hdulist[0].header  
>>> prihdr['targname'] = 'NGC121-a'  
>>> prihdr[27] = 99
```

```
>>> prihdr = hdulist[0].header  
>>> prihdr['targname'] = ('NGC121-a', 'the observation target')  
>>> prihdr['targname']  
'NGC121-a'  
>>> prihdr.comments['targname']  
'the observation target'
```

```
>>> prihdr.keys()  
['SIMPLE', 'BITPIX', 'NAXIS', ...]
```


IMAGENS

```
>>> scidata = hdulist[1].data
```

```
>>> scidata = hdulist['SCI'].data
```

```
>>> scidata = hdulist['sci', 2].data
```

```
>>> scidata.shape  
(800, 800)  
>>> scidata.dtype.name  
'float32'
```

```
>>> scidata[30:40, 10:20] = scidata[1, 4] = 999
```

```
>>> photflam = hdulist[1].header['photflam']  
>>> exptime = prihdr['exptime']  
>>> scidata *= photflam / exptime
```


TABELAS

```
>>> hdulist = pyfits.open('table.fits')  
>>> tbdata = hdulist[1].data # assuming the first extension is a table
```

```
>>> print tbdata[0]  
(1, 'abc', 3.7000002861022949, 0)
```

```
>>> cols = hdulist[1].columns
```

```
>>> cols.names  
['ID', 'name', 'mag', 'flag']
```

```
>>> tbdata.field('id')  
array([1, 2])
```

```
>>> tbdata['mag'].mean()  
>>> 84.4
```

EXERCÍCIO

Ler o arquivo FITS fornecido e mostrar:

- O número de HDUs do arquivo
 - Para cada HDU, mostrar o seu tipo e suas principais informações
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