

Handline image coordinates



astropy.wcs

Translate coordinates between images and the sky

Key concepts: WCS objects

Initialization

Pixels \leftrightarrow sky coords

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WCS objects

Initialization

Pixels to sky coords

- WCS = World Coordinate System
- projections of celestial sphere onto a plane
- convert between image and sky coordinates
- footprint of image on sky

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- WCS constructor

WCS objects

```
>>> from astropy.wcs import WCS
```

Initialization

- Initialize from an image header (FITS or text)

Pixels to sky coords

```
>>> from astropy.io import fits  
>>> w = WCS(fits.getheader('data/w5.fits'))
```

- Create from scratch

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WCS objects

Initialization

Pixels to sky coords

- Convert pixel coordinates to celestial coords

```
>>> from astropy.io import fits
>>> w.pixel_to_world(10.5, 200)
```
- Convert celestial coordinates to pixels

```
>>> from astropy.coordinates import SkyCoord
>>> c1 = SkyCoord(ra=46.34604634,
                  dec=59.44975255, unit='deg')
>>> w.world_to_pixel(c1)
```
- High-level API uses Python/C pixel convention

Displaying images with WCS



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Transform image values, for visualization

Key concepts:

- Scale
- Stretch
- WCS axes

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Scale

- Scale: choose lower and upper image values to map to the interval [0:1]

Stretch

- Percentile intervals

WCS axes

- Manual intervals
- Asymmetric Percentile intervals
- ZScale intervals

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Scale

- Stretch: map [0:1] to [0:1] linearly or non-linearly

Stretch

- Linear
- Log
- Sqrt
- Squared
- Sinh
- Power
- PowerDist

WCS axes

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Scale

- Connects WCS object to matplotlib

Stretch

- Labeled axes

WCS axes

- Coordinate grids
- Overlay markers with celestial coordinates