

Proyecto de datos: Mapa de velocidad de NGC 1313 y 1487

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NGC 1313 Y NGC 1487

Field Galaxy

SB(s)d

Distance: 4.2 [Mpc]

$z = 0.00157$

Diameter: 43 [kpc]

Stellar mass: $10^9 M_{\odot}$

Mag Abs NUV GALEX: -17

[1] Messa+2021



Galaxy Pair

Pec. galaxy

Distance: 8.9 [Mpc]

$z = 0.00283$

Diameter: 37 [kpc]

Mass: $10^{10} M_{\odot}$

Mag Abs NUV GALEX: -16.5

[2] Buzzo+2021



Resumen mid term

- Comprender confección de un mapa de velocidad
- Agilizar proceso a futuro
- Datos:

Cubos MUSE



NGC 1487

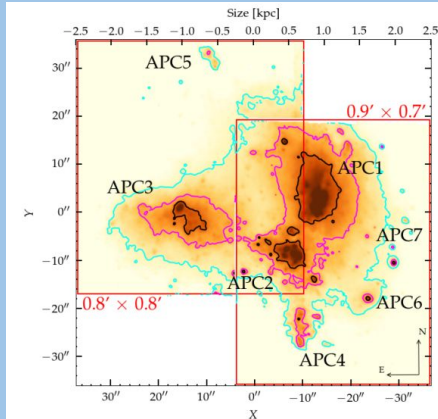


Figure 1. MUSE reconstructed V-band image of NGC 1487. Overlaid are the V-band contours, which delineate the areas where the surface brightness is greater than 18 (black), 19 (magenta), and 20 (cyan) mag arcsec⁻². Highlighted in dark red are the four condensations present in the merging system NGC 1487, APC1, APC2, APC3, and APC4, first proposed by Agüero & Paolantonio (1997) and the tidal tails, APC5, APC6, and APC7, which we propose in this work. White regions within the galaxy indicate masked pixels in the datacube. As red rectangles, we show the MUSE pointings and respective sizes of each cube used in this work.

[1] Buzzo+2021

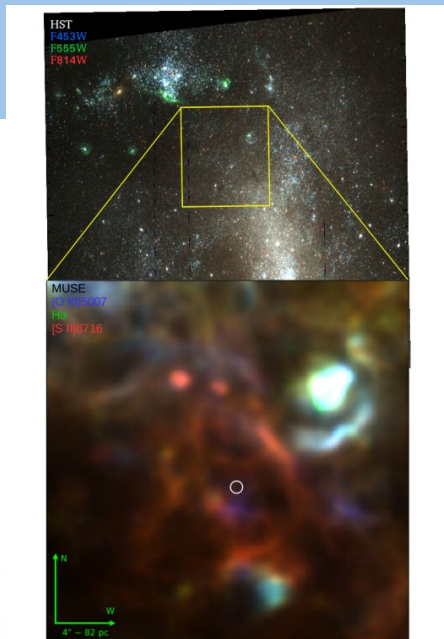


Fig. 4. *Top:* composite HST image showing F435W (Blue), F555W (Green) and F814W (red) ACS/WFC images downloaded from the HLA archive (ObsID hst_9796_01_acs_wfc_f814w_f555w_f435w). The yellow square shows the region shown in the MUSE image in the bottom panel. *Bottom:* MUSE RGB image of the nebula around NGC 1313 X-1 corresponding to the yellow square in the HST image, showing fluxes in H α (green channel), [O III] λ 5007 (blue channel) and [S II] λ 6717 (red channel) lines.

OBJ:

- aprender POO para creación velocity map



NGC 1313

[2] Gúrpide+2022

Avance

- Idea original → **crear** un mapa de velocidad
→ reinventar la rueda ...

OBJ:

- aprender POO para creación velocity map

NEW OBJ:

- Entendimiento del manejo de un cubo de datos en base a POO

Proceso Exploratorio



surprise !

- ★ Manera “predeterminada” de tratar un cubo
- +
- ★ Tutorial Velocity Map

Real desafío:

- Manejo de POO
- Aplicación y adaptación

Aprendizaje y Aplicación Herramientas

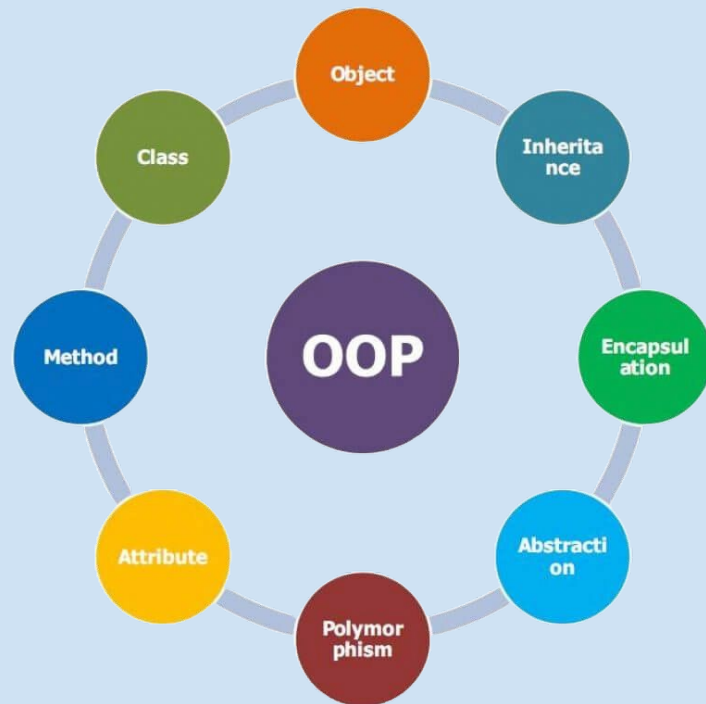


Visual Studio Code



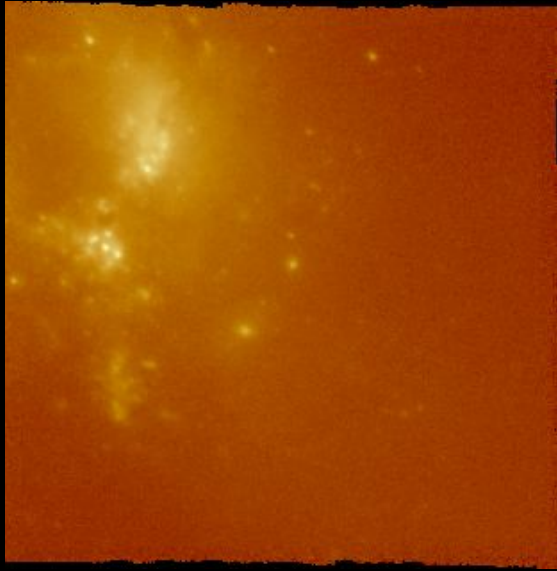
Learning Goals

- Find and download data using `astroquery`
- Read and plot slices across different dimensions of a data cube
- Compare different data sets (2D and 3D) by overplotting contours
- Transform coordinate projections and match data resolutions with `reproject`
- Create intensity moment maps / velocity maps with `spectral_cube`

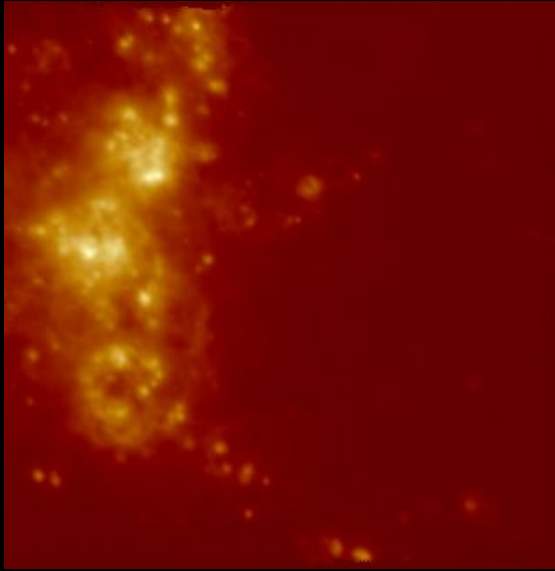


Logros

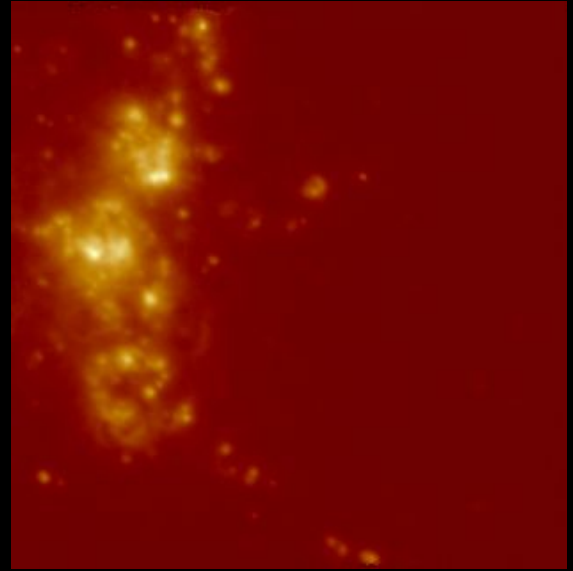
NGC 1487 - STAR FORMING REGIONS (emission)



Original



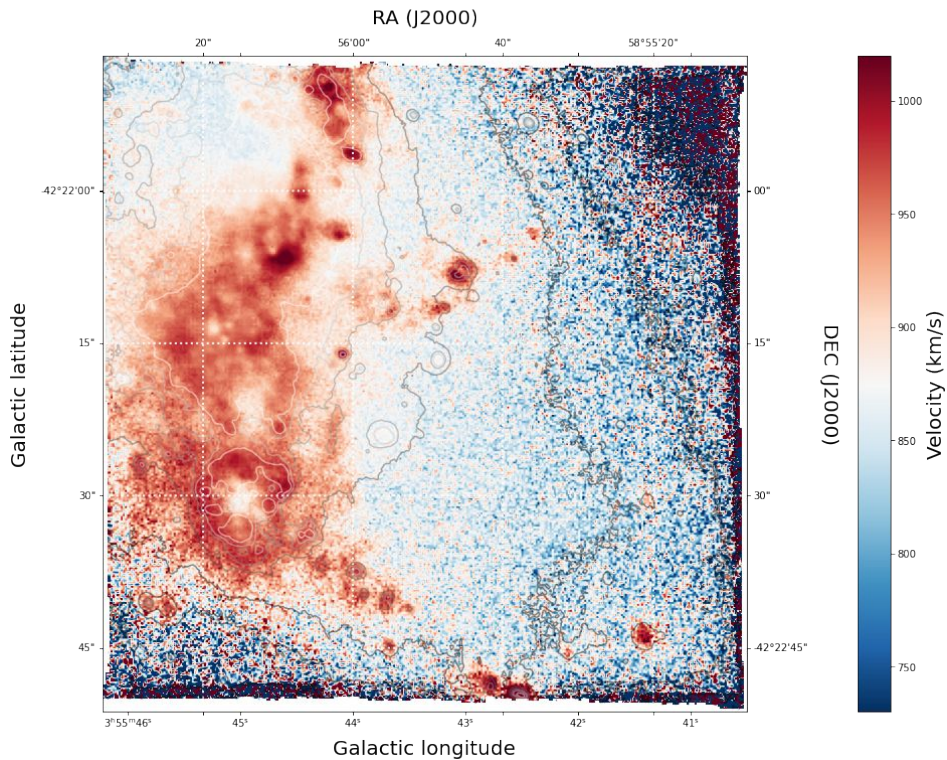
H alpha



[O III]

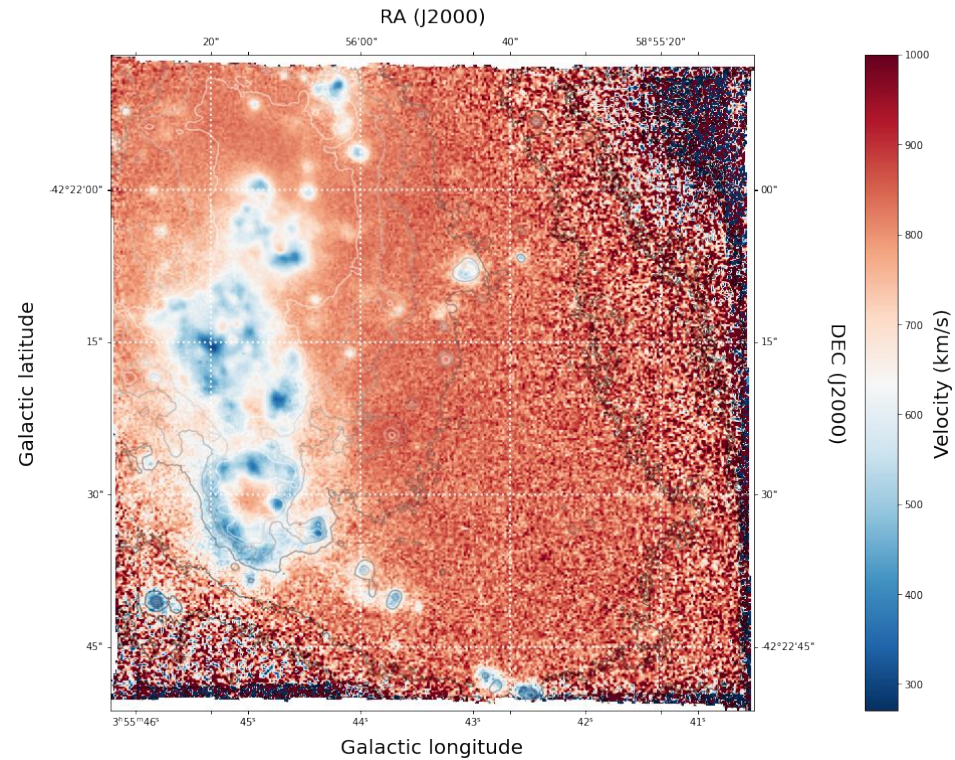
NGC 1487 - VELOCITY MAP

H α Velocity Map of NGC 1487



H α

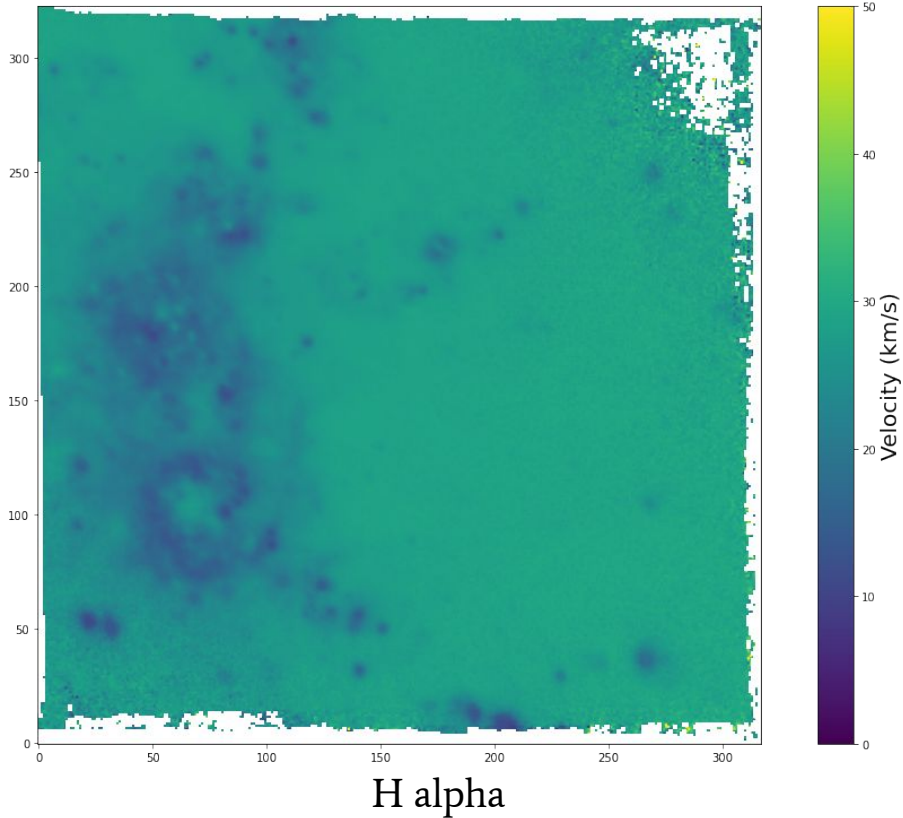
[OIII] Velocity Map of NGC 1487



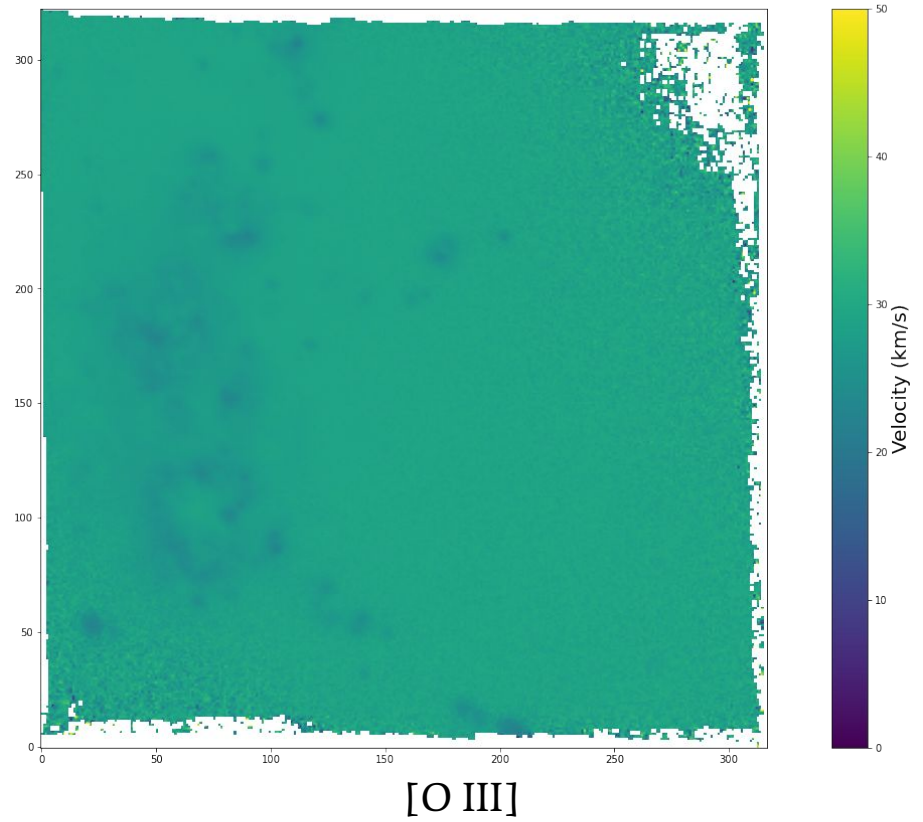
[O III]

NGC 1487 - DISPERSION VELOCITY MAP

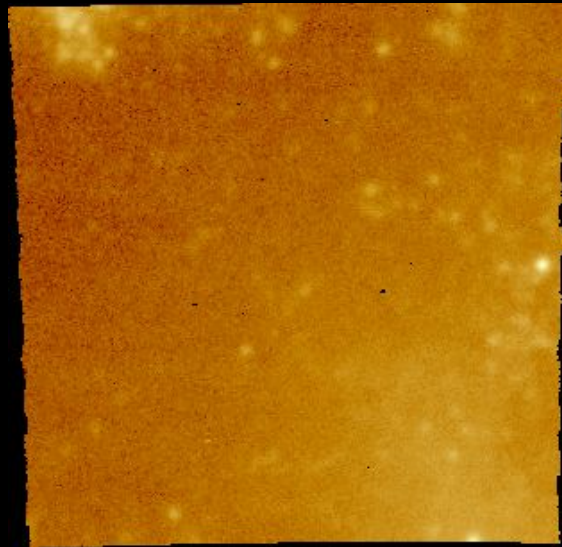
H α Velocity Dispersion Map for NGC 1487



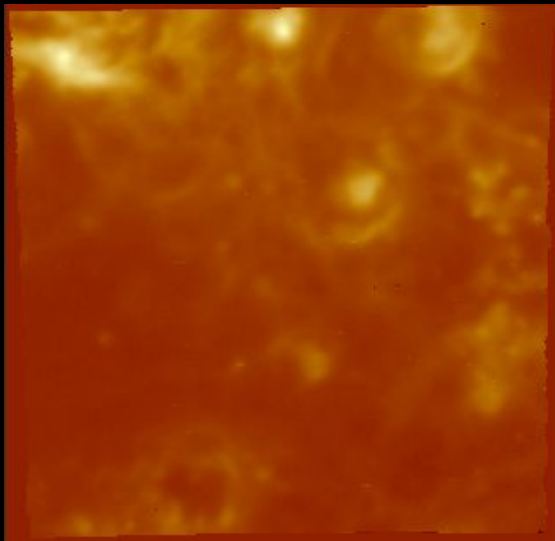
[OIII] Velocity Dispersion Map for NGC 1487



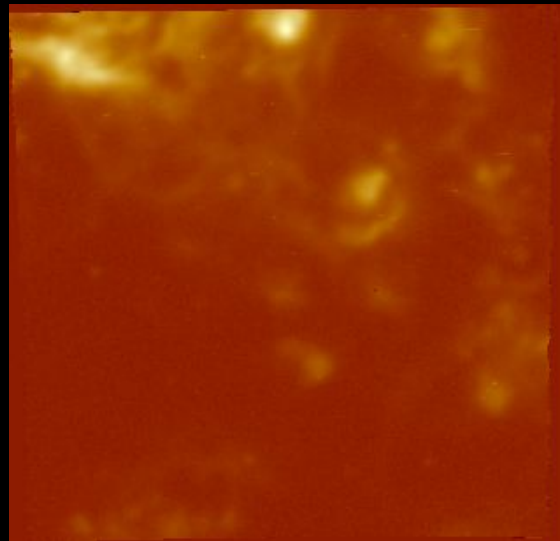
NGC 1313 - STAR FORMING REGION (emission)



Original



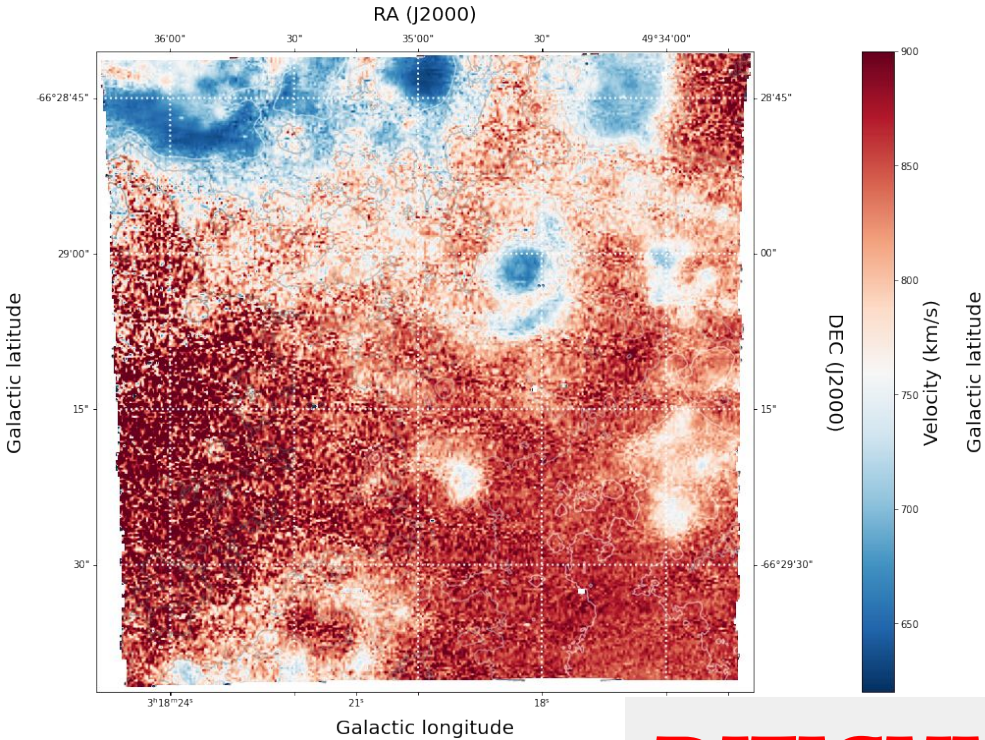
H alpha



[O III]

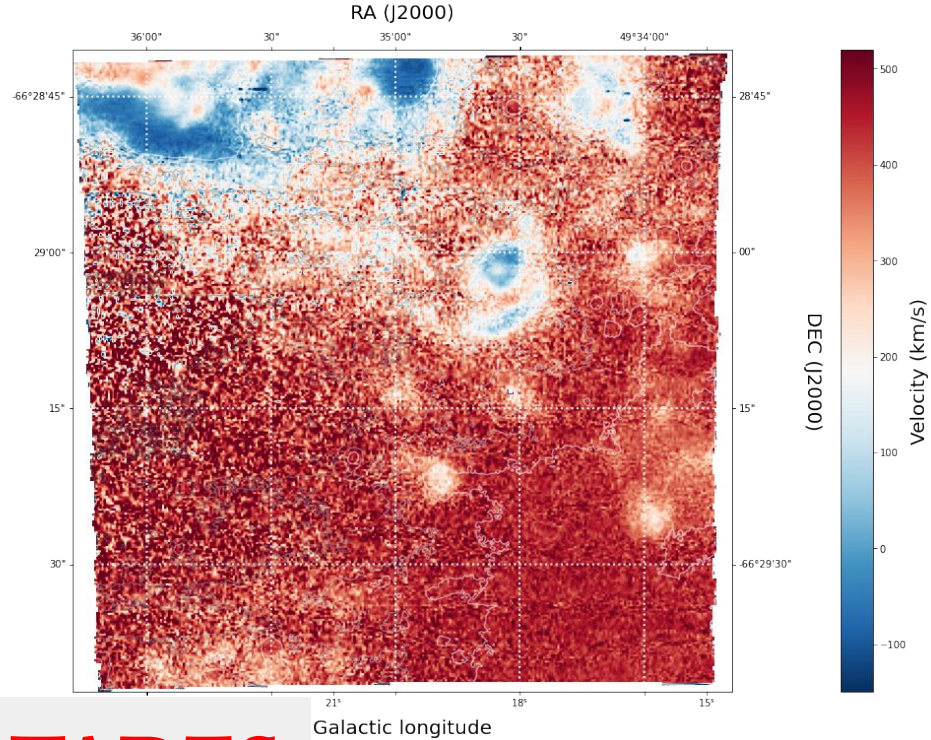
NGC 1313 - VELOCITY MAP

H α Velocity Map of NGC 1313



H alpha

[OIII] Velocity Map of NGC 1313



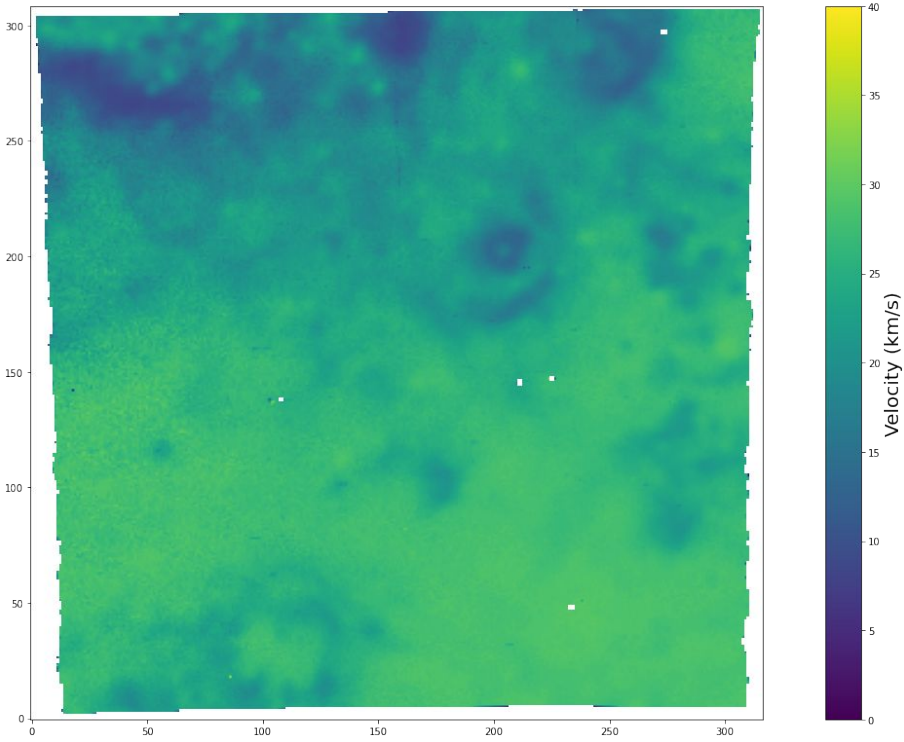
[O III]

DIFICULTADES

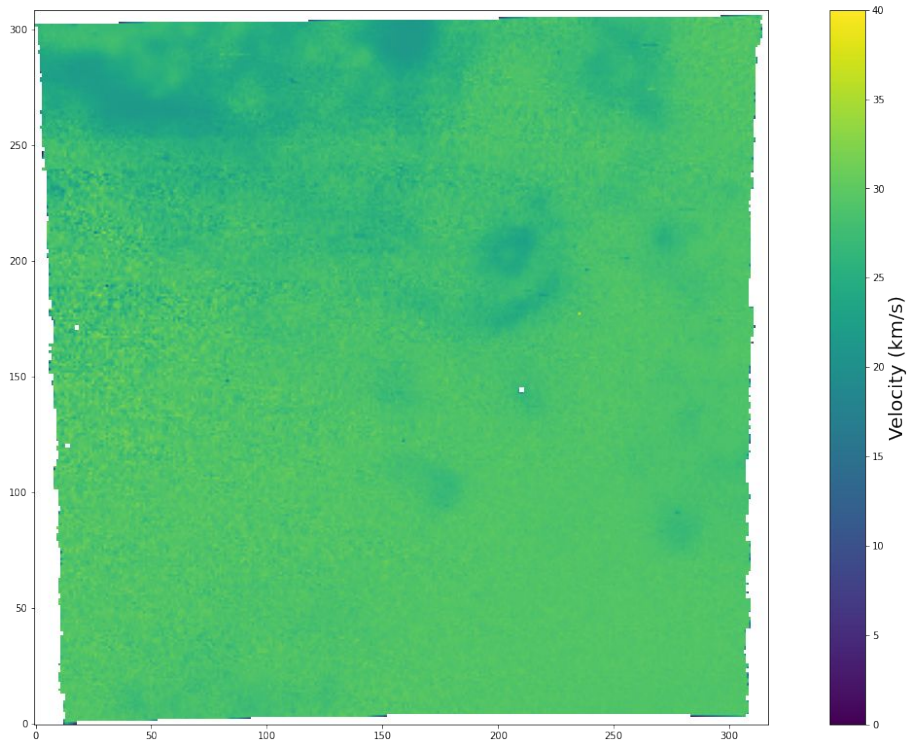
NGC 1313 - DISPERSION VELOCITY MAP

H α Velocity Dispersion Map for NGC 1313

[OIII] Velocity Dispersion Map for NGC 1313



H α



[O III]

Logros y Dificultades

- Mapa de Velocidad logrado
 - + dispersión de velocidades
- Entendimiento POO, manejo de atributos y métodos
- Aprendizaje en manejar cubos de datos
- Lograr un objetivo claro
- Mayor habilidad en herramientas como VSCode
- Lograr mapas correctos en valor
- Generalizar código para cubos
- Mejorar

Fracción del objetivo

- Mapa de velocidad ✓
- Entendimiento POO ✓

Pendiente:

- Crear un mapa de velocidad genérico sin necesidad de correr todo denuevo
- Arreglar velocidad



<https://github.com/blnblnbln/astroinf/tree/main/proyecto>

Referencias

Papers

[1] Messa, M. et al. (2021) “Looking for Obscured Young Star Clusters in NGC 1313”, *The Astrophysical Journal*, vol. 909, no. 2, .
doi:10.3847/1538-4357/abe0b5.

[2] Buzzo, M. L. et al. (2021). “Physical and kinematic conditions of the local merging galaxy NGC 1487.” *Monthly Notices of the Royal Astronomical Society* 503, 106–123.
doi:10.1093/mnras/stab426

[3] Gúrpide, A. et al. (2022), “MUSE spectroscopy of the ULX NGC 1313 X-1: A shock-ionised bubble, an X-ray photoionised nebula, and two supernova remnants”, *Astronomy and Astrophysics*, vol. 666, 2022. doi:10.1051/0004-6361/202142229.

Páginas web

[1] Tutorial Mapas de Velocidad con Cubo
<https://learn.astropy.org/tutorials/FITS-cubes.html>

[2] Linewidth maps (σ)
<https://spectral-cube.readthedocs.io/en/latest/moments.html#linewidth-maps>

[3] Entendimiento cubo
<https://mpdaf.readthedocs.io/en/latest/objformat.html>