

Astrophysical Objects

Interstellar medium

Analysing observational data

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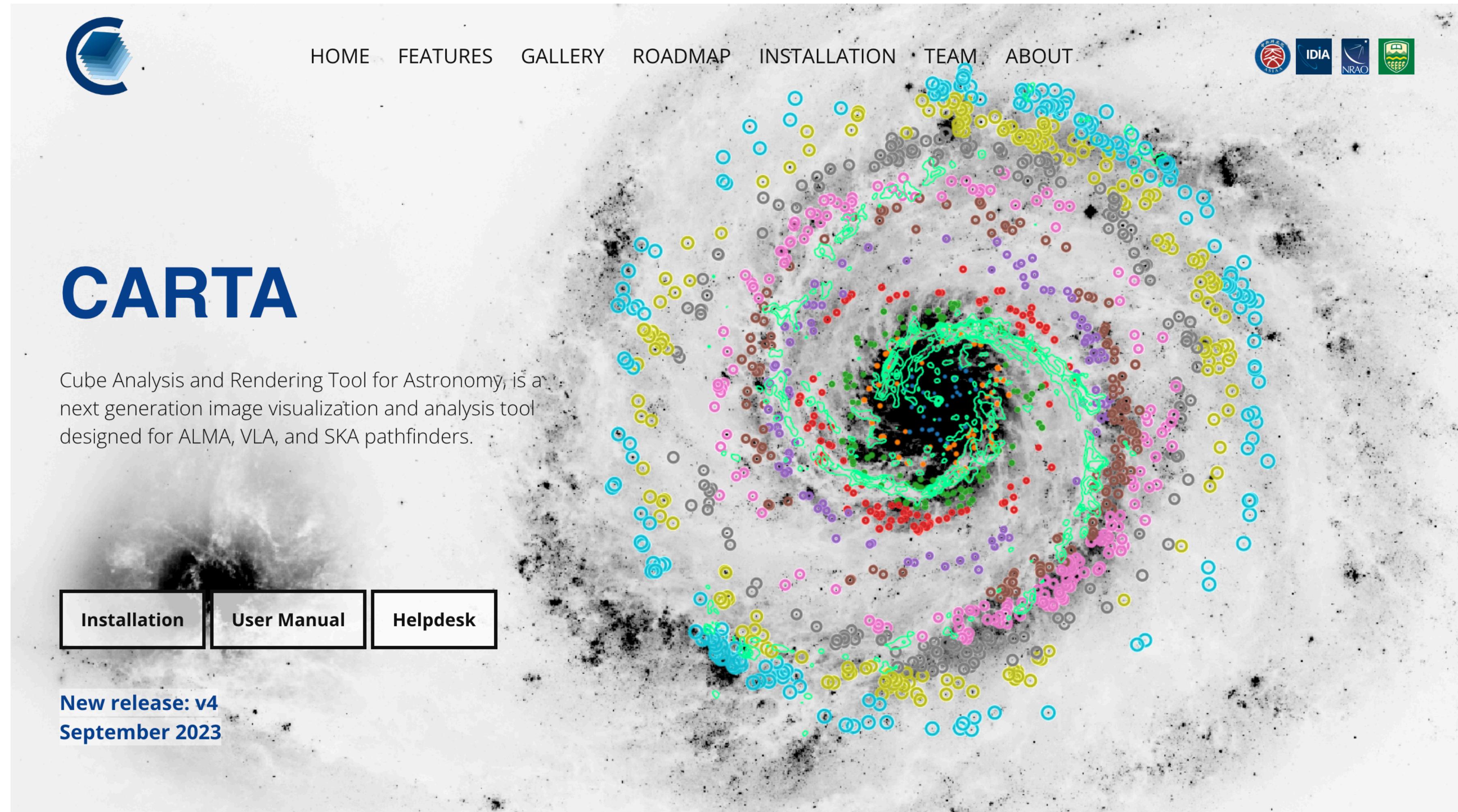
**SCHOOL OF
PHYSICAL SCIENCES
AND NANOTECHNOLOGY**

Viewing fits files

Viewing images in fits files with CARTA

<https://cartavis.org/>

- Easy to install
- Can open large files
- Can open files from remote server

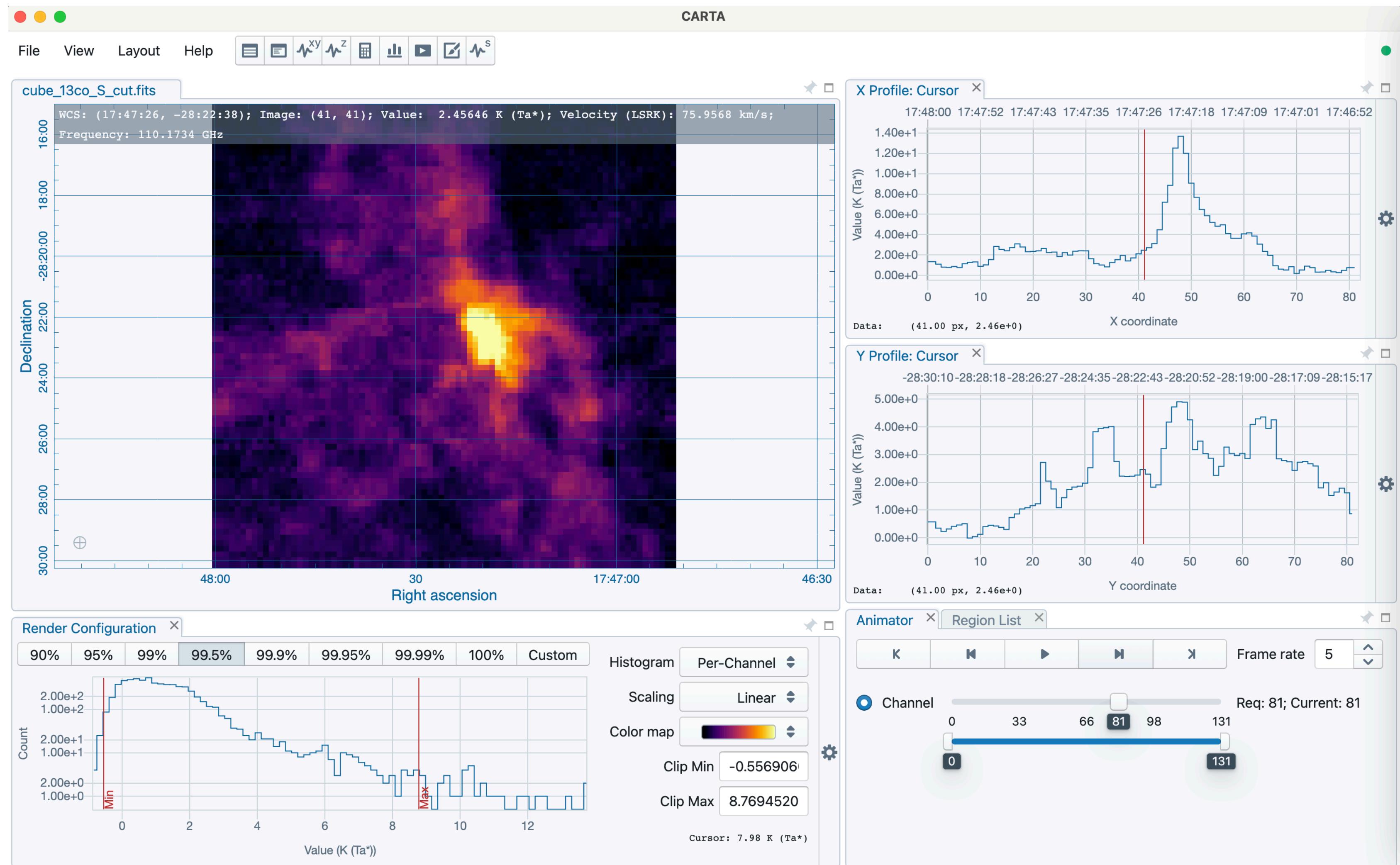


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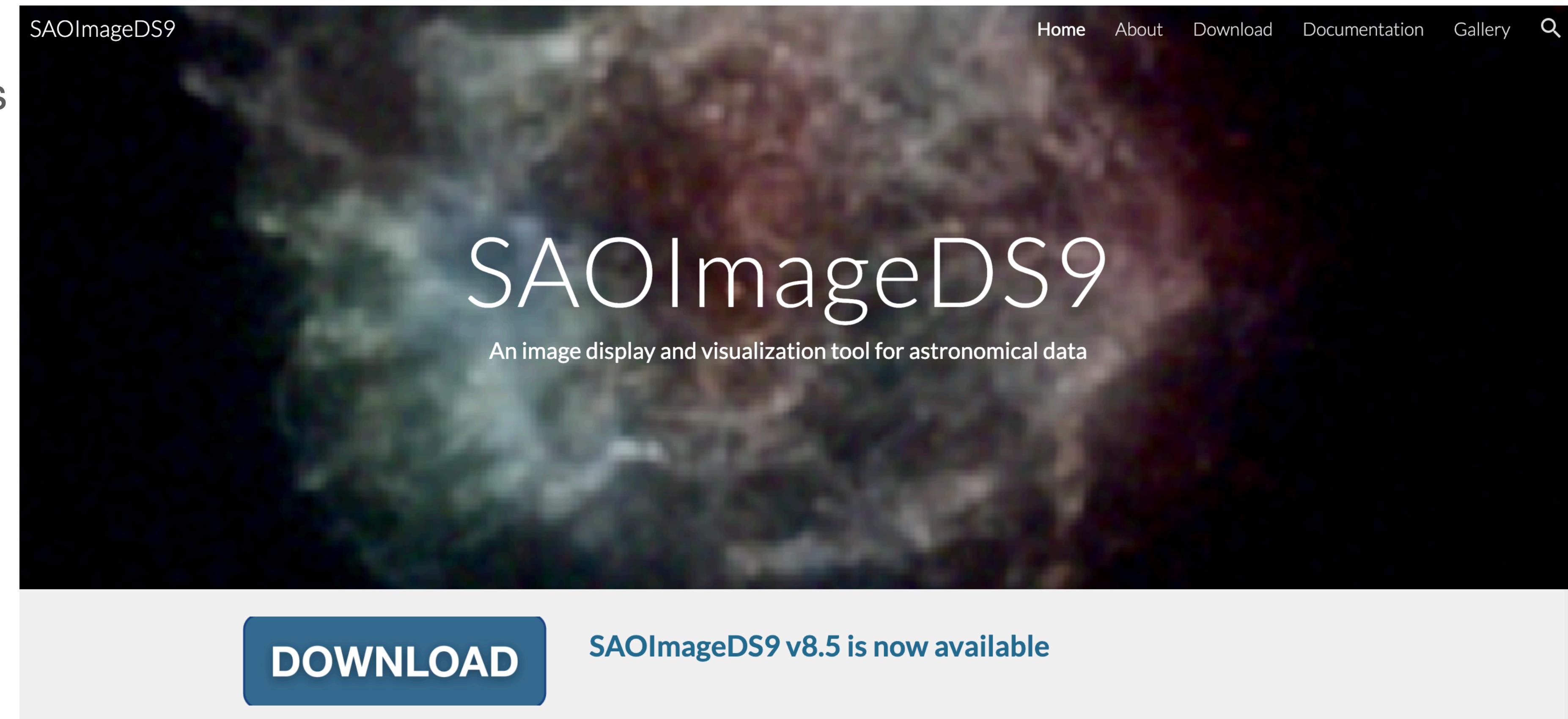


Viewing fits files

Viewing images in fits files with DS9

<https://sites.google.com/cfa.harvard.edu/saoimageds9>

- Easy to install
- Has many functionalities

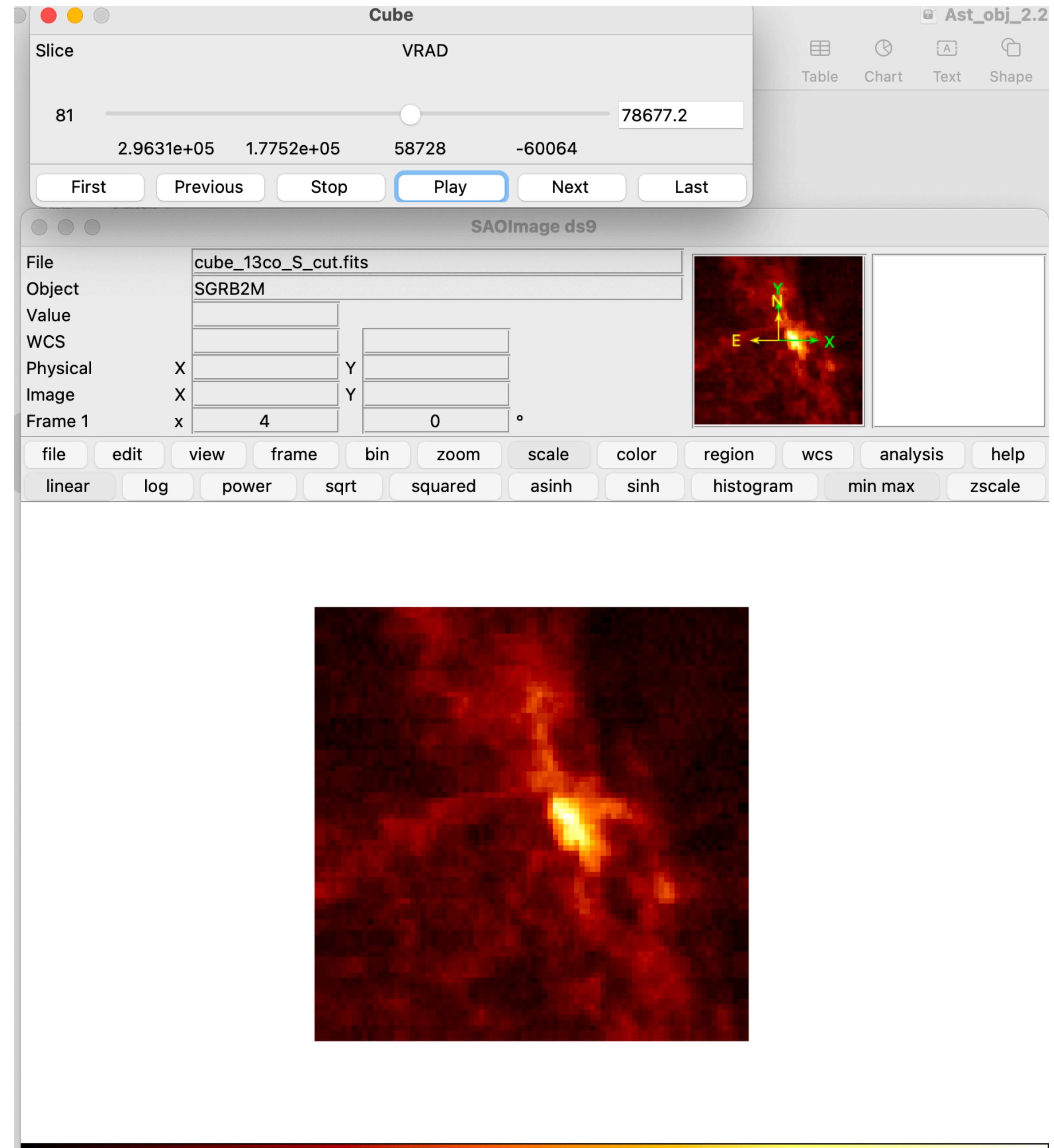


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Viewing fits files

Using Astropy

<https://www.astropy.org/>



The screenshot shows the homepage of the Astropy Project. At the top, there is a dark navigation bar with the word "astropy" in orange and white, followed by links for "About", "Get Help", "Contribute", "Documentation", "Affiliated Packages", "Team", and "Credits". To the right of the navigation bar is a search bar labeled "Search Documentation". The main content area features a large, stylized logo consisting of a white spiral on an orange gradient background, with the text "The Astropy Project" next to it. Below the logo, a paragraph explains that the project is a community effort to develop a common core package for Astronomy in Python and foster an ecosystem of interoperable astronomy packages. It also states that the community is committed to supporting diversity and inclusion and encourages users to acknowledge and cite the use of Astropy. A section titled "What's new in Astropy 5.3?" provides information about the current version (5.3.3). At the bottom, there is a section titled "Install Astropy" with instructions for using the Anaconda Python Distribution and a code snippet for updating the package using conda.

astropy About ▾ Get Help Contribute Documentation ▾ Affiliated Packages Team Credits

Search Documentation

The Astropy Project

The Astropy Project is a community effort to develop a [common core package](#) for Astronomy in Python and foster an ecosystem of [interoperable astronomy packages](#).

The Astropy community is committed to supporting diversity and inclusion.

Please remember to [acknowledge and cite](#) the use of Astropy!

What's new in [Astropy 5.3?](#)
Current Version: 5.3.3

Install Astropy

The [Anaconda Python Distribution](#) includes astropy and is the recommended way to install both Python and the astropy package. Once you have Anaconda installed use the following to update to the latest version of astropy:

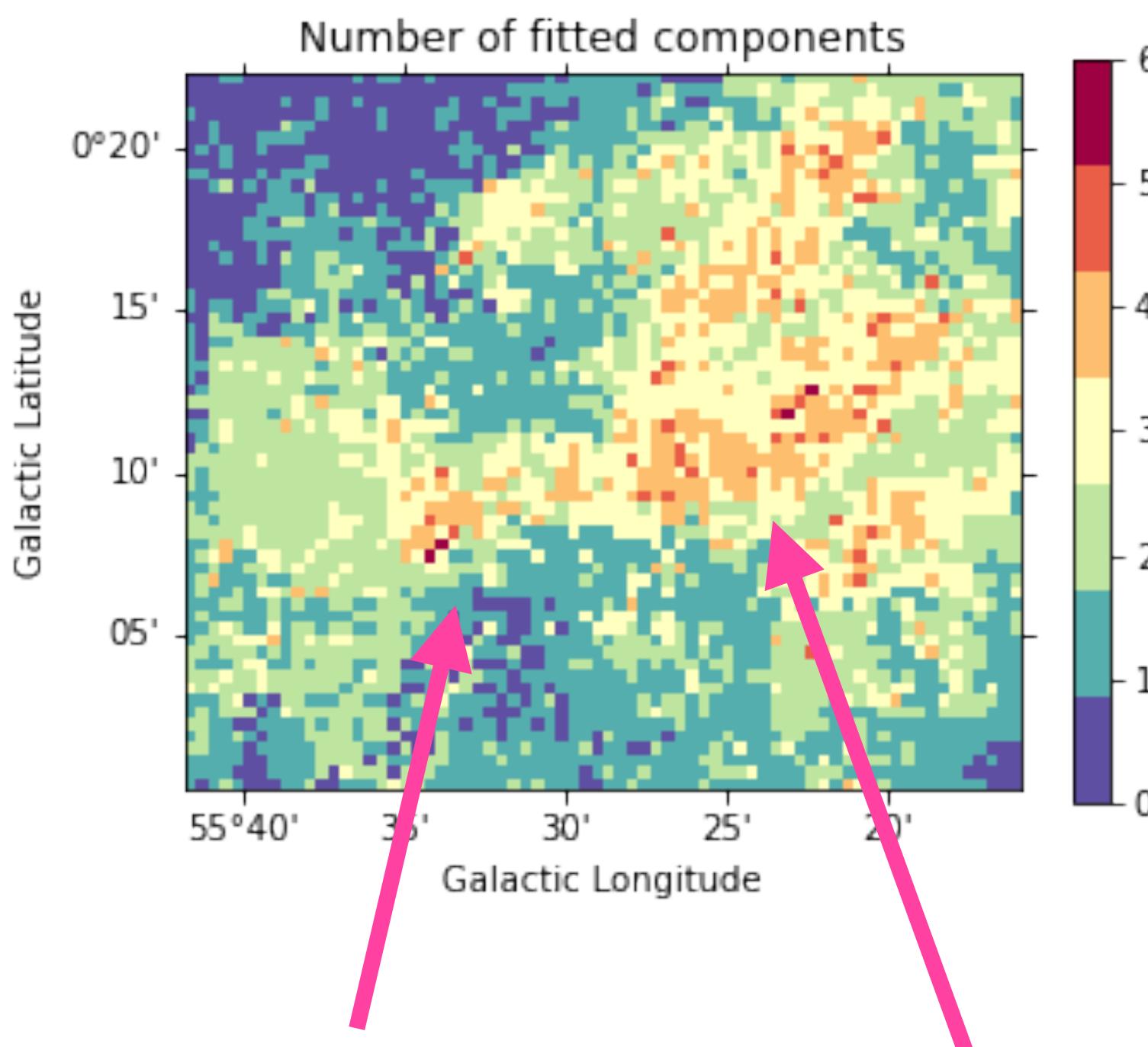
```
conda update astropy
```

GaussPy+

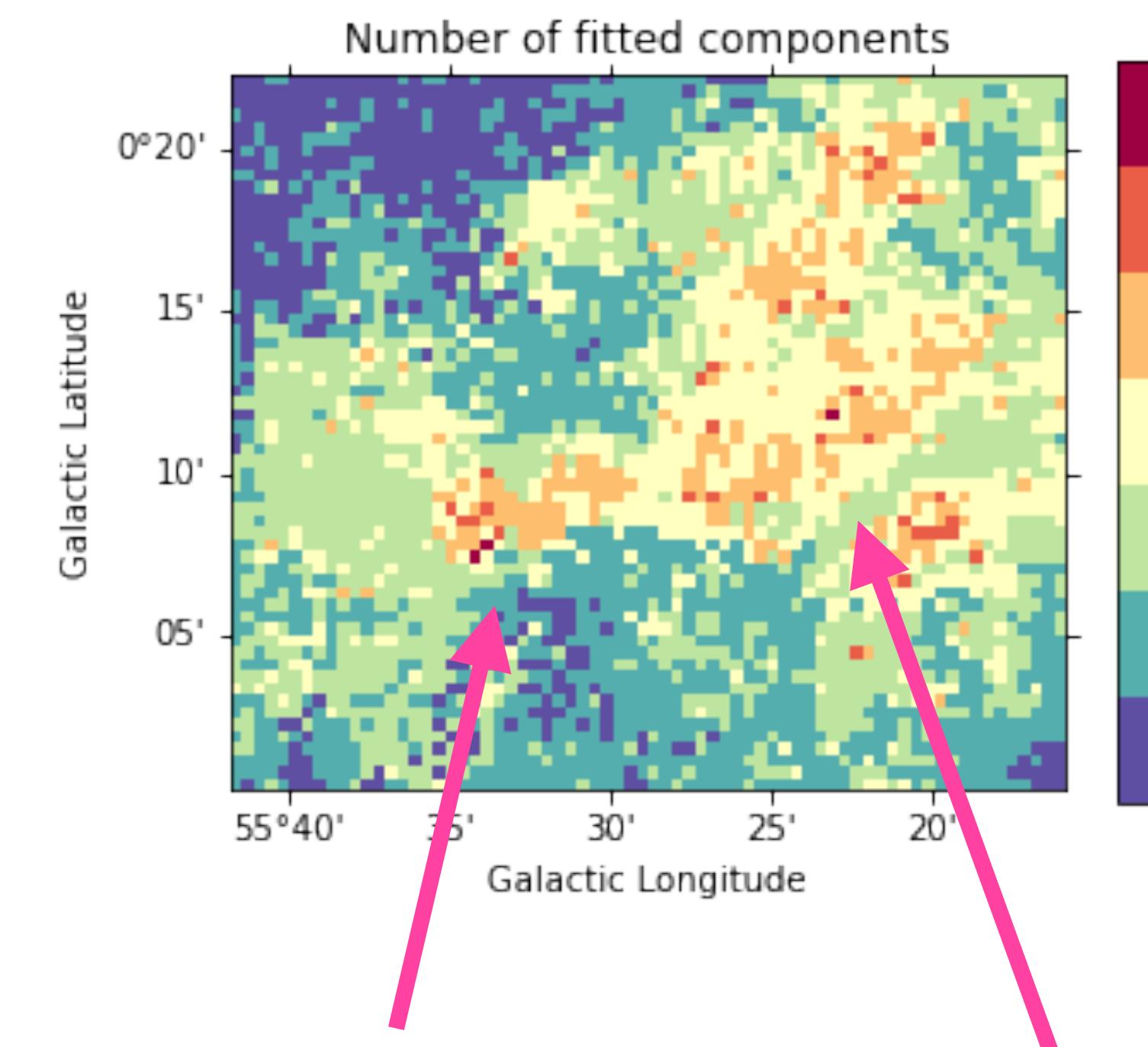
<https://github.com/mriener/gausspyplus/tree/master>

Decomposition results

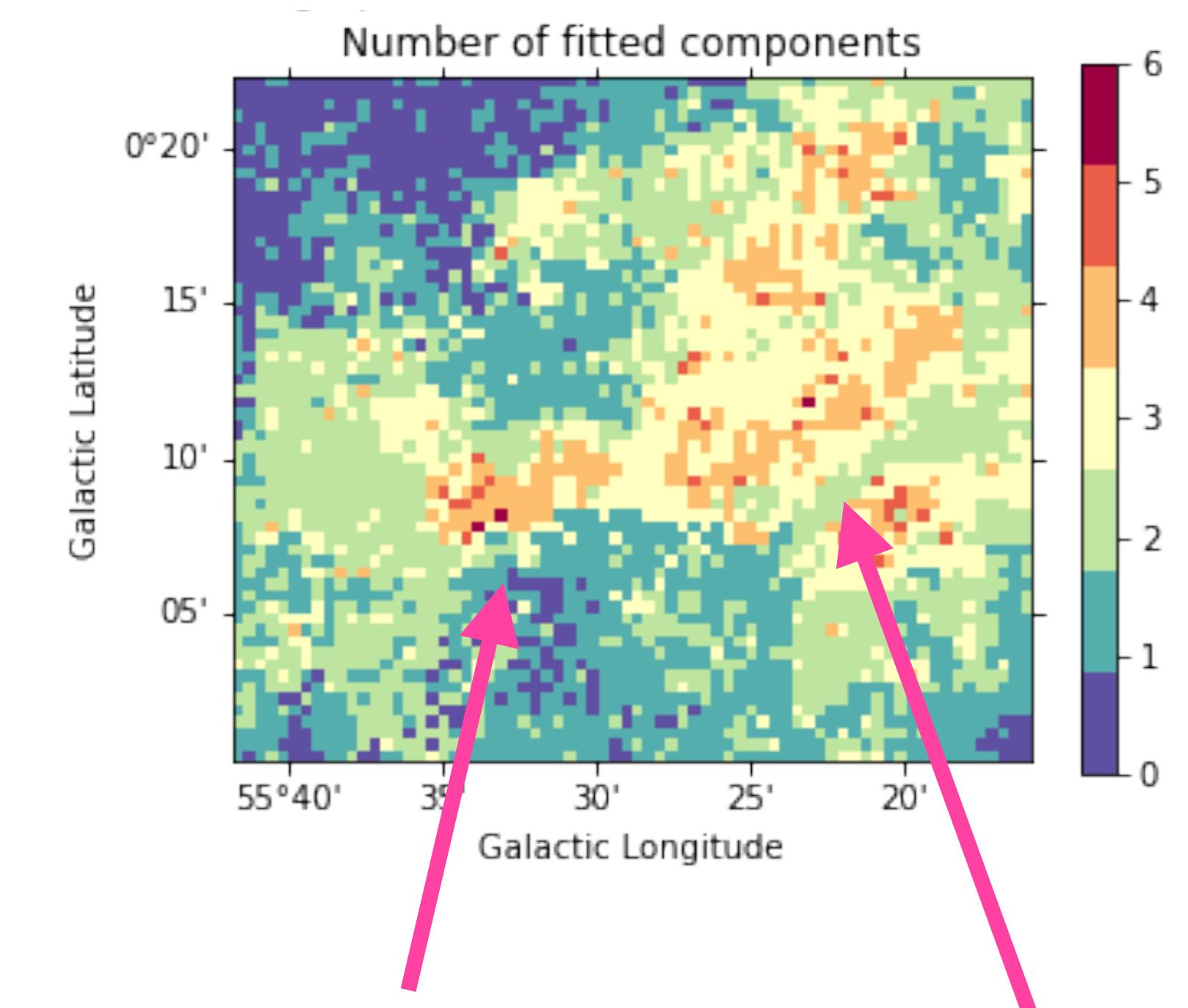
First decomposition



Phase 1 refitting



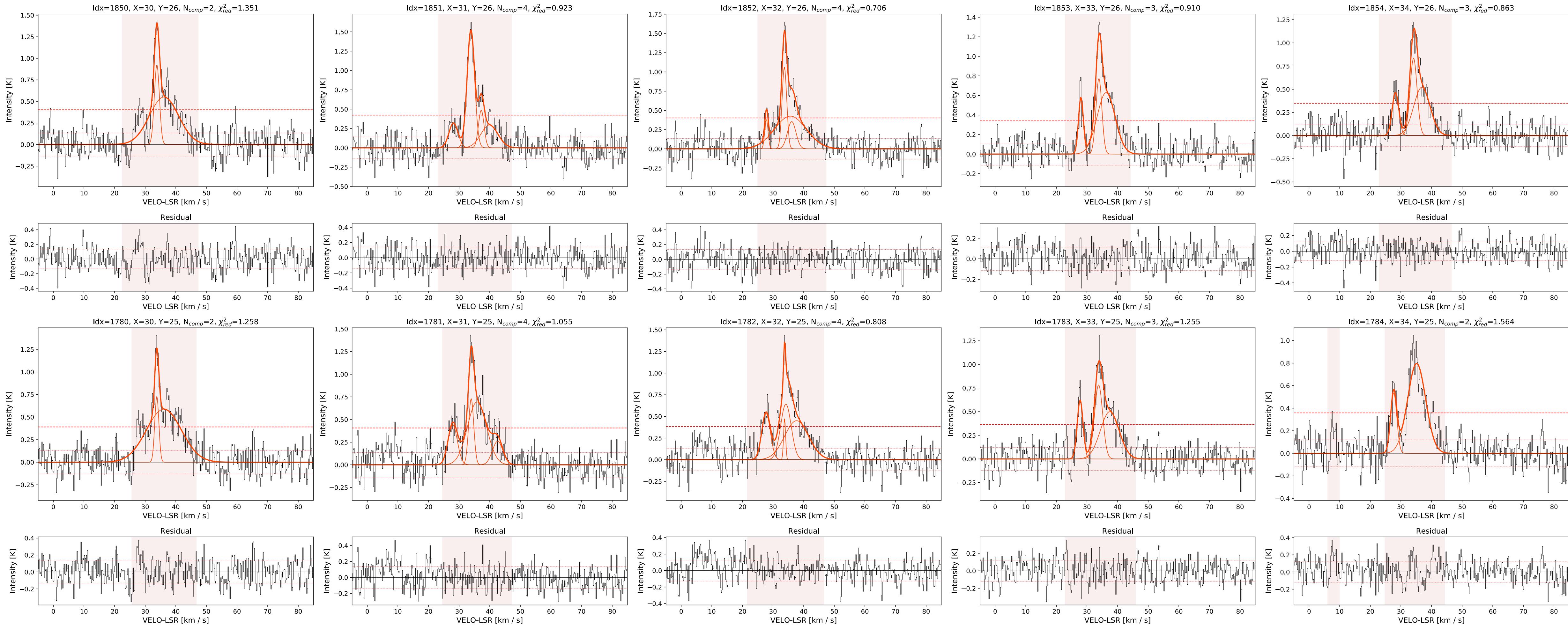
Phase 2 refitting



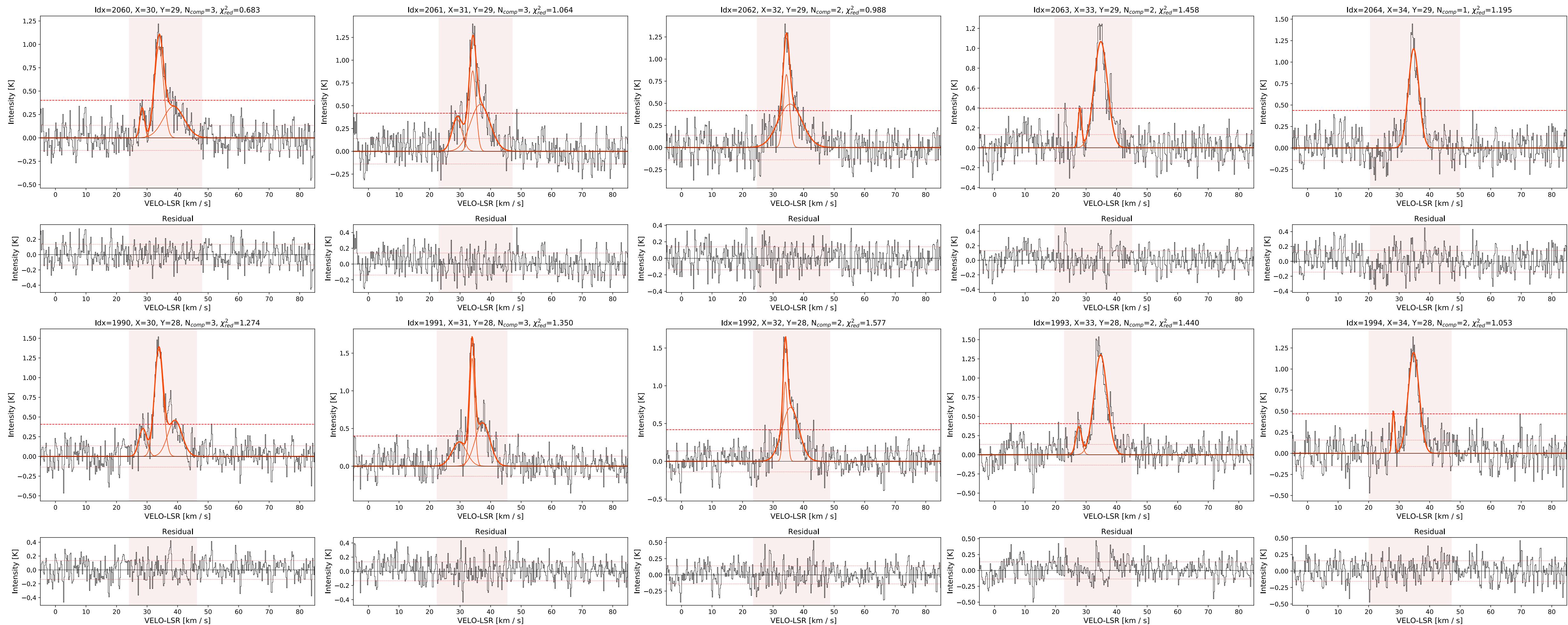
More orange
4 components

More yellow
3 components

Decomposition results



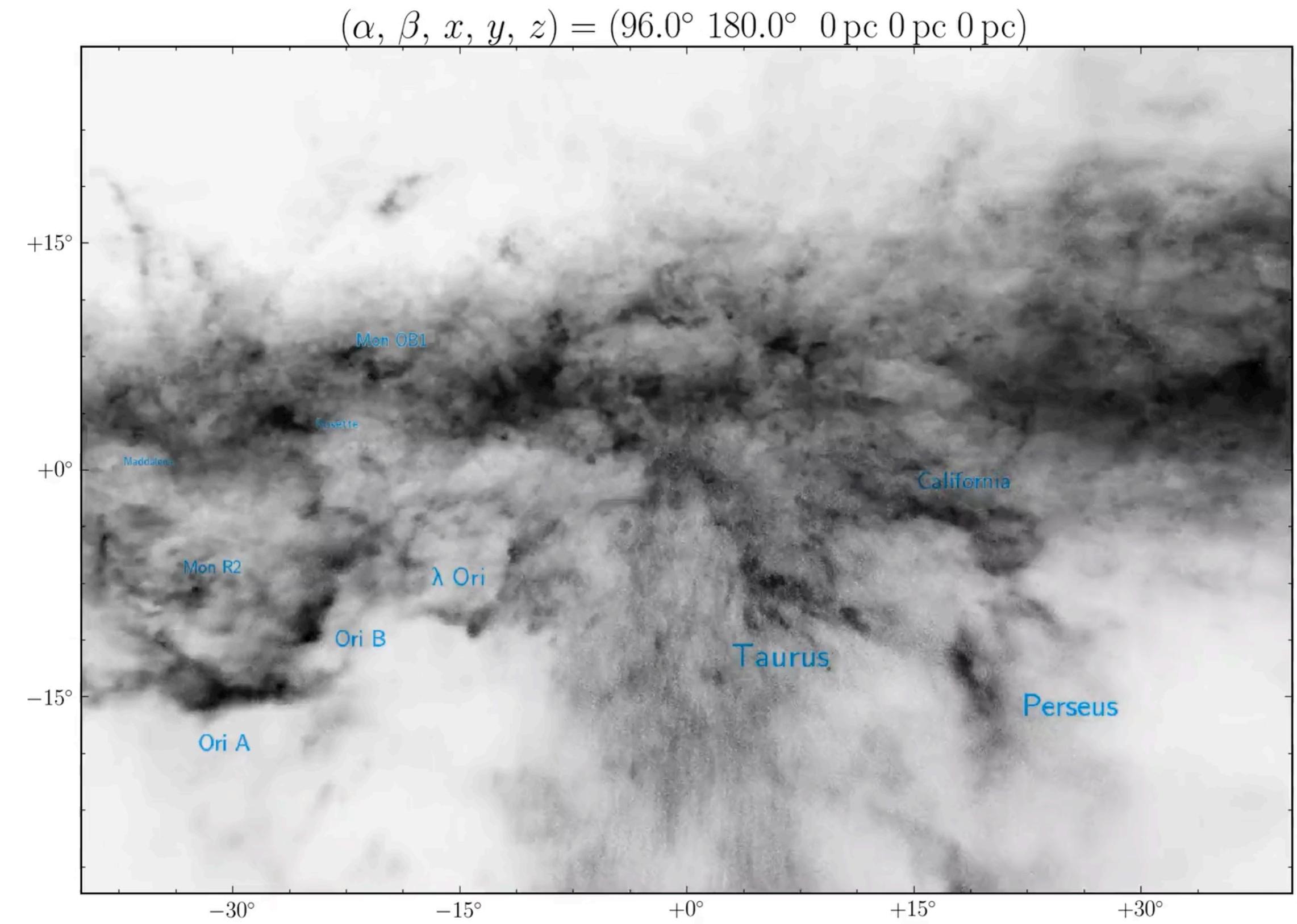
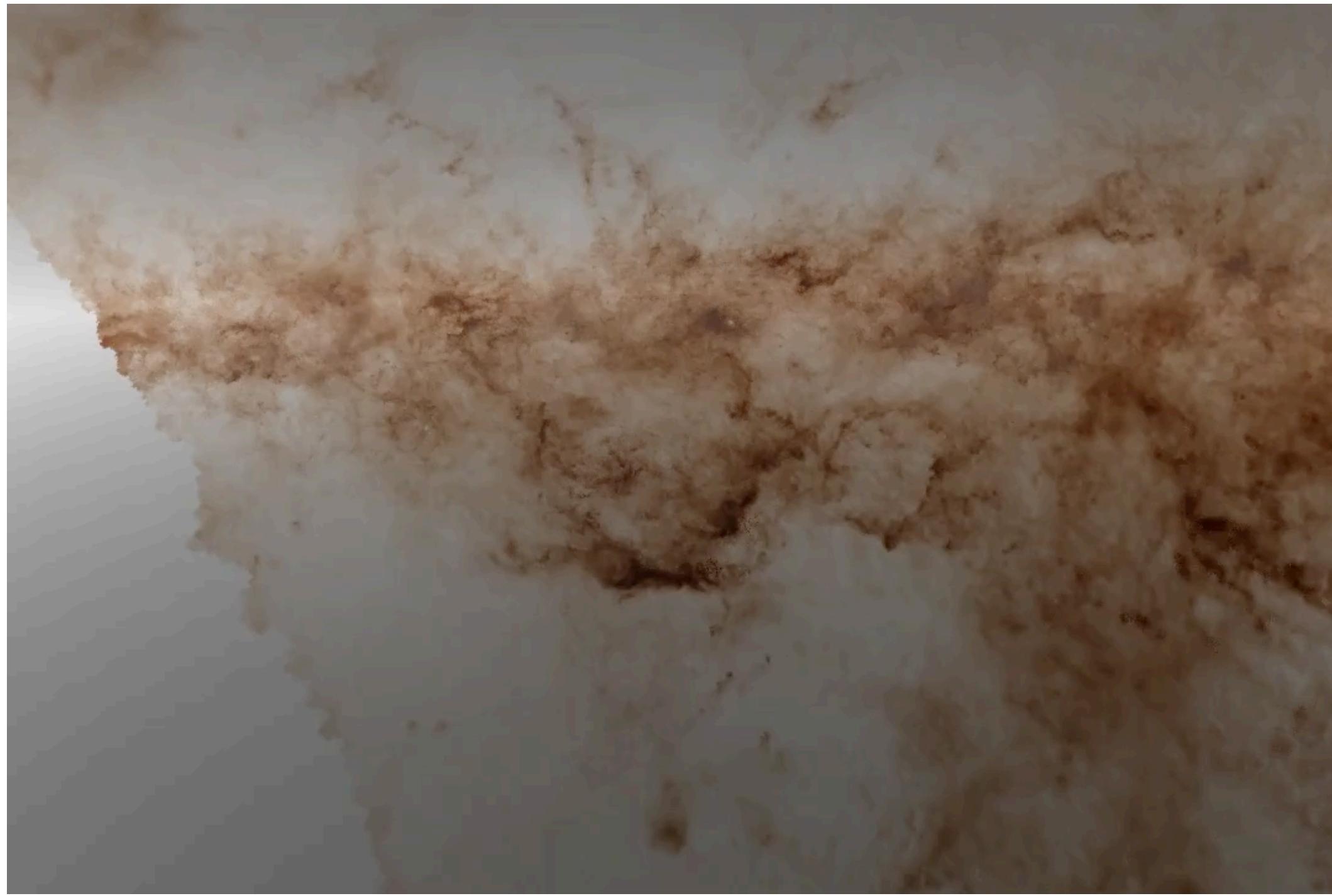
Decomposition results



Interstellar extinction - dust

3D Dust Mapping
with Pan-STARRS 1, 2MASS and Gaia

-> **Dust tutorial**



Dust vs. Gas

The correlation between dust extinction and HI column density is well known.

Example plot from Güver and Özel 2009.

Note: at high dust opacities this relation does not hold anymore. -> HI gets converted to H₂

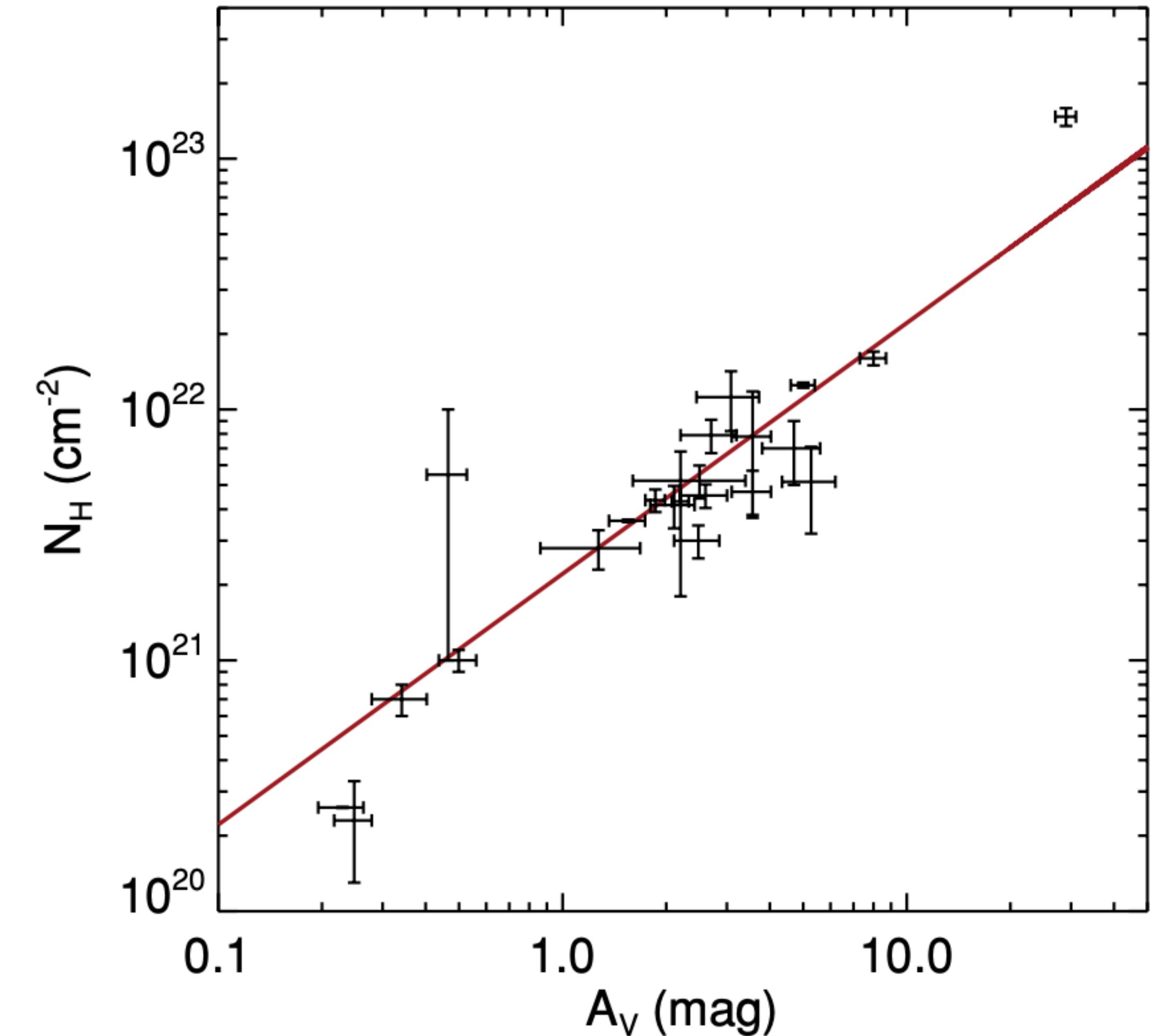
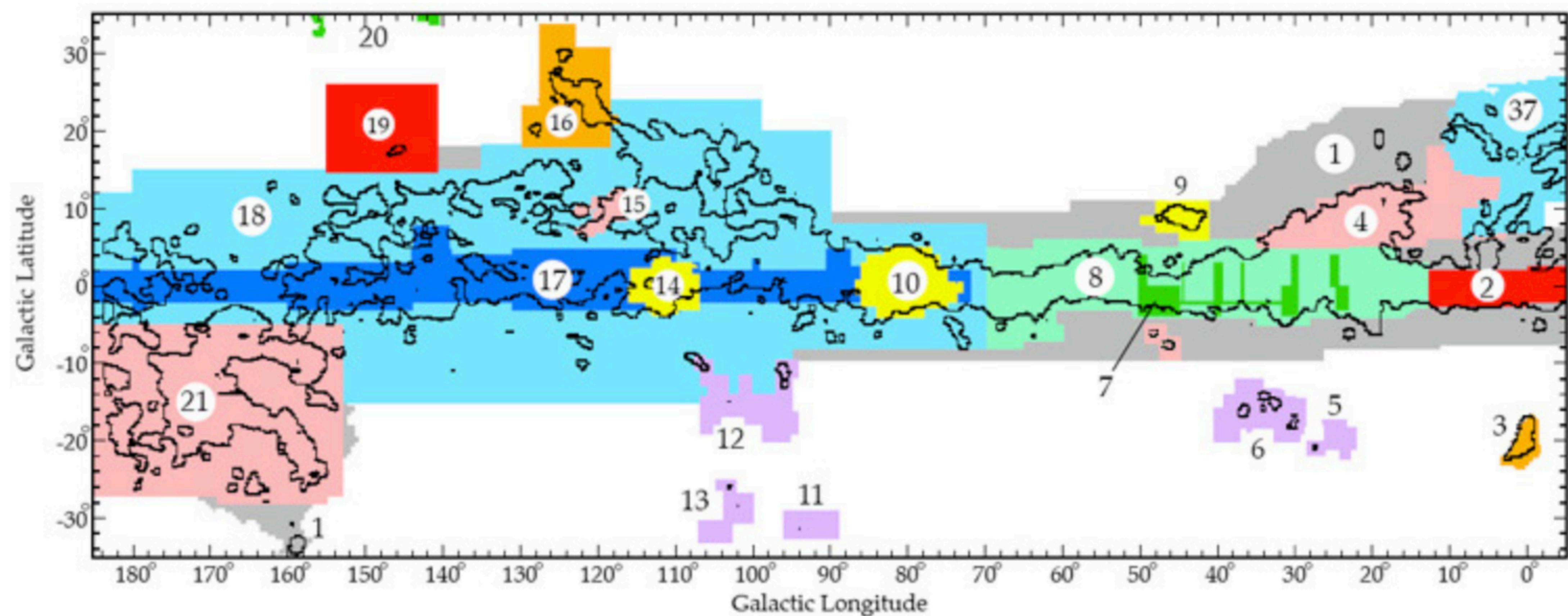


Figure 1. The observed correlation between hydrogen column density and optical extinction, together with the best-fitting linear model, found as $N_{\text{H}} = (2.21 \pm 0.09) \times 10^{21} \times A_V$.

How do I know where are the molecular clouds?

Dame et al, 2001 has a map of the whole galaxy with the individual molecular cloud complexes numbered.

<https://lweb.cfa.harvard.edu/rtdc/CO/IndividualSurveys/>



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