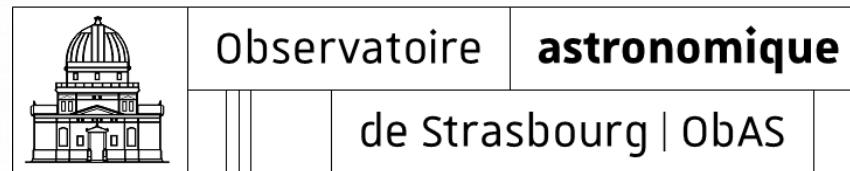


Radio data and the VO

- thoughts of an astronomer -

Katharina Lutz

CDS / CNRS / Observatoire Astronomique de
Strasbourg

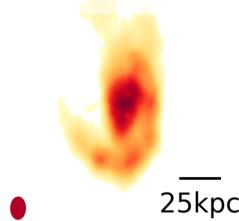




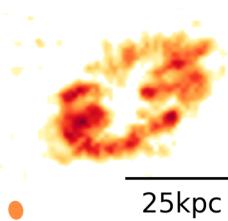
My background

- HI in local galaxies
- Targeted observations and archival observations
- Mostly ATCA

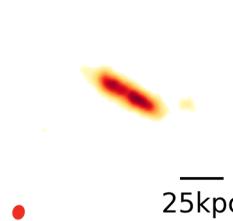
ESO378-G003



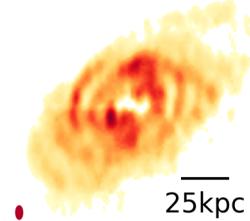
ESO121-G026



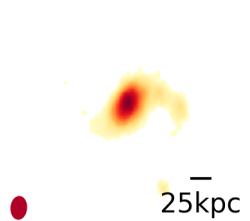
ESO287-G013



NGC0289



ESO381-G005





Radio astronomy so far

- For those who applied for observations:
 - Observe
 - Retrieve
 - Reduce
 - Use and Publish
- For everyone else:





Future





An astronomer's questions for archives

- I. Has an object been observed in a particular telescope set-up?
- II. How can I access the data?
- III. In which state is the data?
 - Data cubes: has the data been reduced in a way that is useful for my science goals?
 - Visibilities: how do I turn the visibilities into science ready data products?



Has an object been observed?

- Options: Tables or potentially MOC
- Important informations for me:
 - Exposure time
 - Array configuration
 - Correlator (Detector) Set-up
 - “Field of View”
- Table should be easy to query



Demo THINGS HiPS

- Already super useful
- BUT only Moment maps and not entire cubes
→ probably because different central frequencies?
- What is still needed:
 - Deal with different central frequencies
 - Be able to show frequency or velocity of current plane

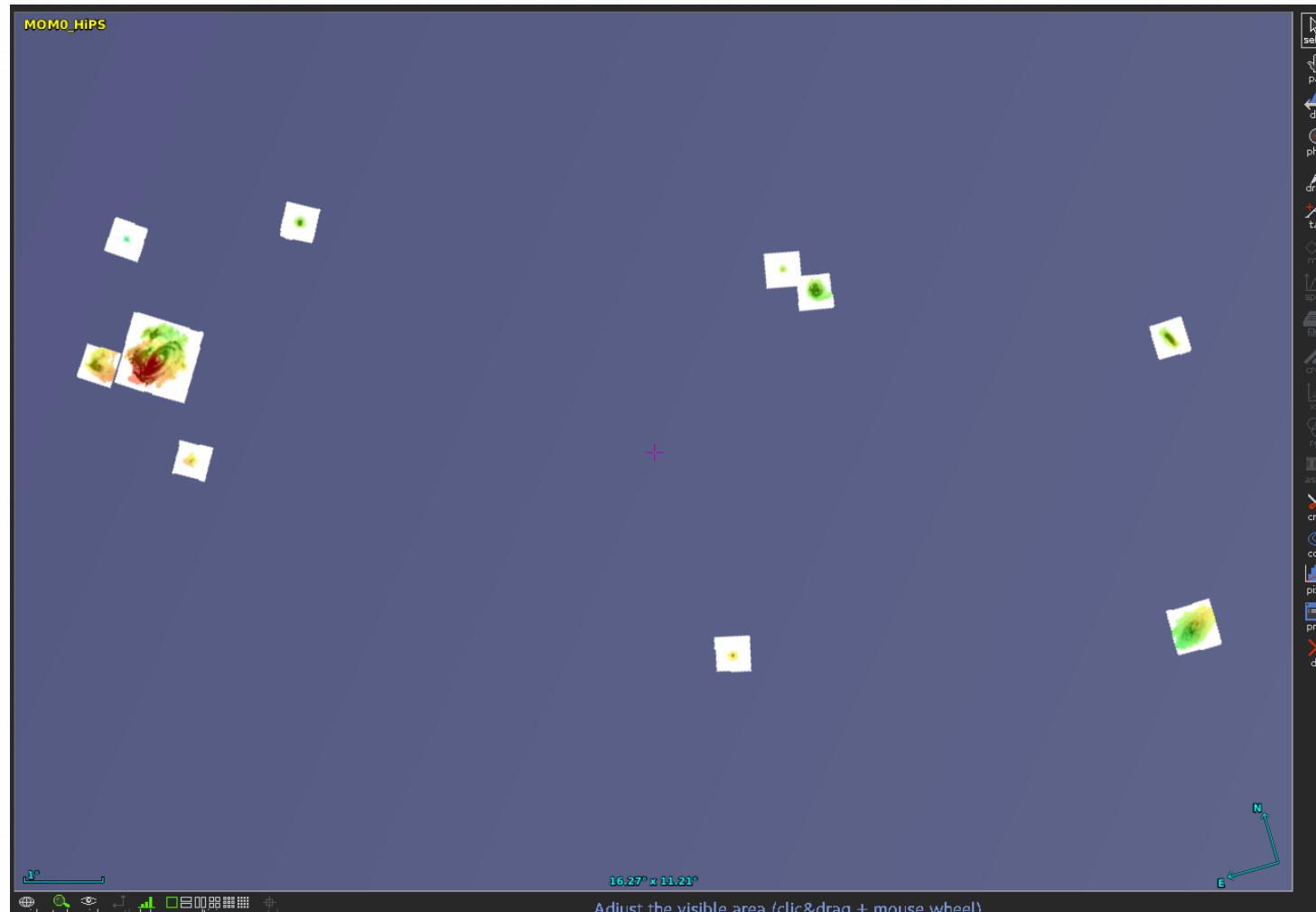


THINGS moment 0 maps in Aladin





Add moment 1 maps





Overlay on optical images



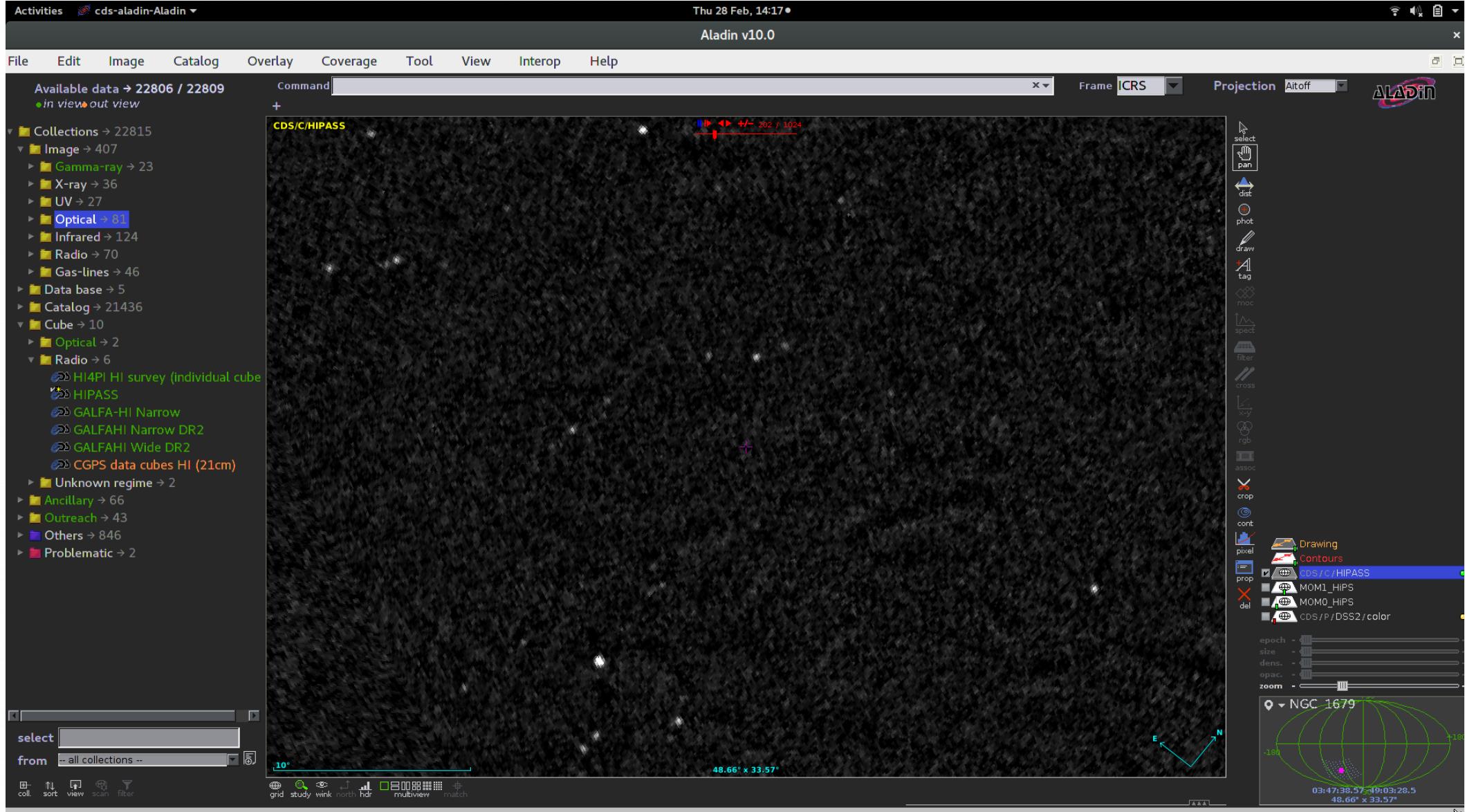


H I contours on optical images





HIPASS on the VO





How to access the data?

- Download from an online query form through a webpage?
- Get from an ftp service?
- Use of VO tools/ services?
- Send an email?
- Do I need an account?
- Where are calibration/auxiliary files?



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e.g. load data into Jupyter Notebook with standard Python VO packages, reduce data there



Accessing science ready data

- It seems that (many/some?) fellow radio astronomers do not trust data that they did not reduce themselves...
- Provenance and published reduction pipelines are very important!
- Some set-ups might provide e.g. emission line and continuum observations at the same time, would need to provide both.



Accessing science ready data

- Great for colleagues from other wavelengths, makes data more accessible for everyone :)
- Interesting for data mining experiments.



Accessing raw visibilities

- Usually not an option for astronomers without a radio background.
- Requirements for computing power and storage increase, starting to be beyond what average astronomer can access.
- If an astronomer is familiar with radio data, they might be able to optimise the data for their science use case (also true for calibrated visibilities).



My dream archive



- Reduced data cubes accessible through VO protocols.
- Public reduction pipeline so that researchers can understand what happened to the data.
- Raw data but considering future large data sets rather “code to data” approach than vice versa.