Week 1, recap

So far...

- Principles of interferometry
- How to drive CASA
- EVN data and analysis
- Calibration and imaging
  - Through to a final EVN image of 3C345
  - Working on e-MERLIN data on 3C277.1
- Self-calibration

Key things you should have learnt

- Fourier space – long baselines, high spatial frequencies, small things; short baselines, low spatial frequencies, big things
- In radio astronomy you can never see everything at once
- uv plane coverage matters!
- More telescopes = better uv plane coverage = less for deconvolution to do (but more data)

Key things you should have learnt

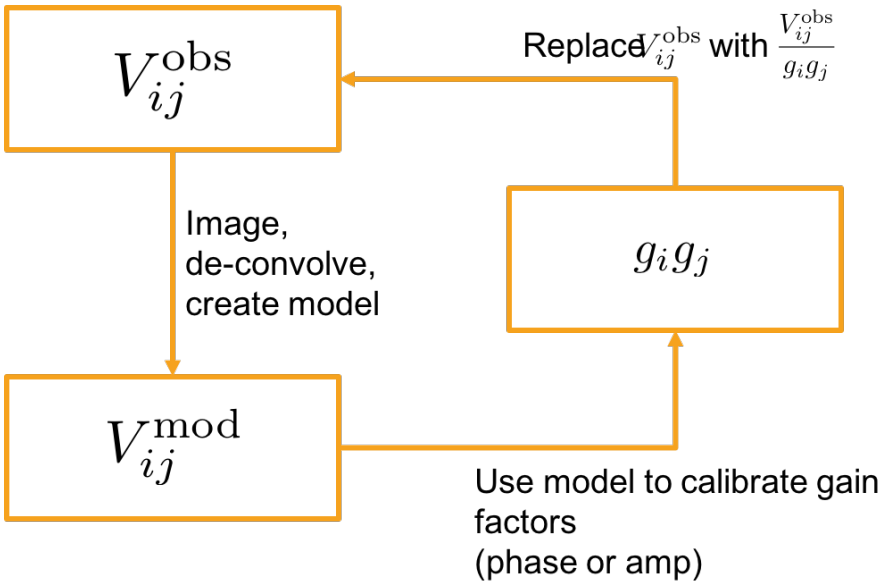
- Phase tells us where things are, amplitude tells us how bright they are
- Phase is more important than amplitude!
- Phase corrupted by atmosphere (ionosphere at our frequencies)
- Amplitude affected by relatively slow changes in electronics (plus decorrelation)
- Ideally solve for fast-varying phase first, then slow-varying amplitude

Key things you should have learnt

- Calibration solves for *antenna-based complex gains* (amplitude, phase)
- Need to have enough antennas that this is overconstrained (easy)
- Need to have enough signal to noise to solve on the timescales we want (maybe hard)
- Solution interval for phase should be as short as possible, but not so short that you start running out of signal

Key things you should have learnt

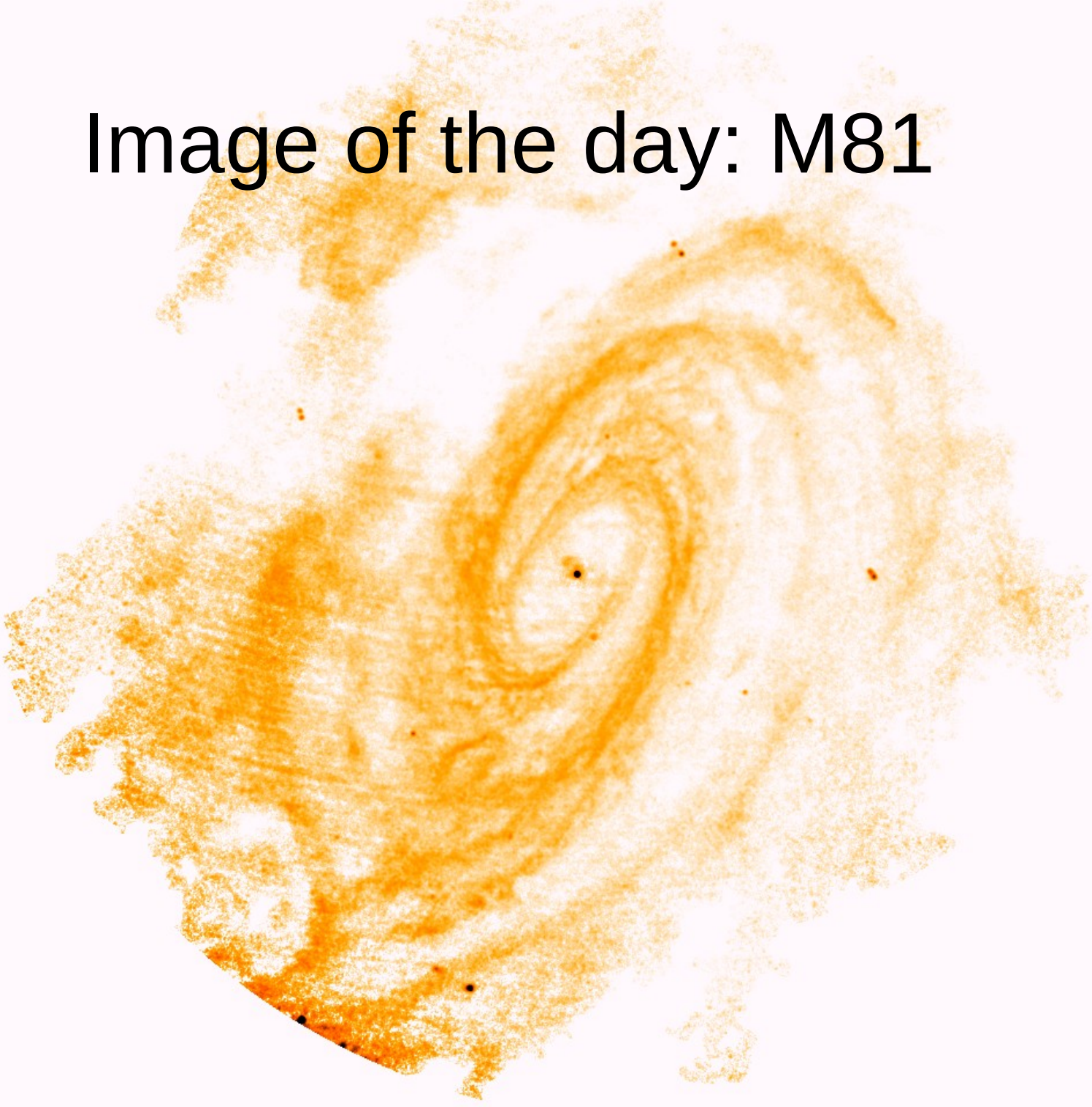
- Self-calibration is like calibration but with the image of the target as the starting model
- Need good enough a priori calibration to get a starting image (or, in extreme cases, guess)
- Then go round the loop
- Stop when self-cal has converged, i.e. solutions stop changing
- Make sure you image everything that's there! (esp. with small arrays)



This week!

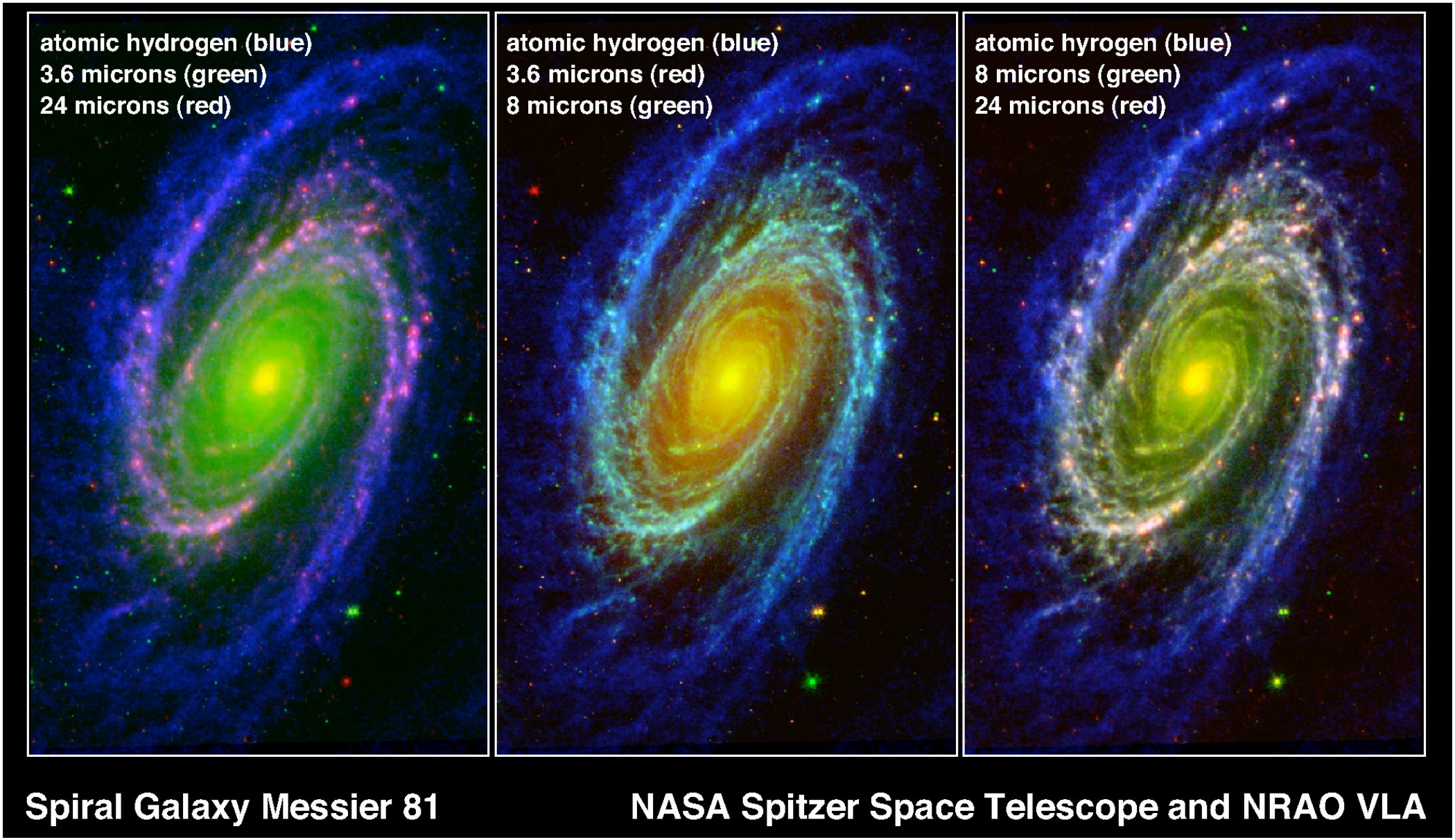
- Imaging and calibration continued
  - Finish off 3C277.1
  - Spectral line imaging – NGC 660
- More on data errors and hazards
- Advanced imaging
- More science
- Where next? Proposals, projects, academia

Image of the day: M81



M81: quick facts

- Nearby spiral galaxy (3.6 Mpc away)
- Radiation mechanism: HI 21-cm spin transition
- One of the more spectacular spirals from the THINGS project
- VLA B,C,D data at 1.4 GHz
- Source fills the VLA primary beam (note the edges). Careful choice of cropping makes it prettier (next slide)
- Published by Fabian et al 2008


atomic hydrogen (blue)
3.6 microns (green)
24 microns (red)
atomic hydrogen (blue)
3.6 microns (red)
8 microns (green)
atomic hyrogen (blue)
8 microns (green)
24 microns (red)
Spiral Galaxy Messier 81
NASA Spitzer Space Telescope and NRAO VLA