Program for hands-on session for July 1st

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CASA for radio interferometry data reduction

Topics:
Morning (~1 hr)
* The demands of the next generation of radio interferometers - ALMA, EVLA, e-MERLIN etc.
* The measurement equation and the use of Jones matrices in calibration (outline of terms and references only)
* The Measurement Set for handling visibility data
  - what's in it,
  - what goes with it
* How you run CASA
  - how it works
  - toolkit
* Alternative ways to run CASA
  - one-line tasks
  - scripting
* Calibration etc. in CASA
  - inspecting and editing data
  - bandpass calibration
  - phase and amplitude as a function of time
  - setting the flux scale
  - polarization
* Imaging and refining the science data in CASA
  - imaging options
  - basic spectral line issues e.g. coordinates, continuum subtraction
  - self-calibration
* Demo of simplified CASA data reduction
  - NGC 5921 (VLA, spectral line, no editing, no polarization, no self-cal)

Afternoon: Hands-on

Brief presentation (just before or after teabreak)

* If neccessary (and possible!),
  - demonstrate solutions for any widespread problems
  - reprise any advanced features attracting interest
* Other features (reference list rather than details)
  - simulations
  - single dish
* What sorts of data can CASA handle?
  - interoperability with AIPS - and anything, via python

  - non-radio data
* How to decide what calibration and imaging strategies to use
  - which package(s)?
  - what steps are necessary?
  - what ranges of parameter values to set?
* Brief demo of MERLIN 3C277.1 (continuum with polarization)
  - illustrating decision points

Continue hands-on

Running CASA e.g. if you dowload casapy-24.0.8115-001.tar.gz in a suitable directory. The link also contains instructions for running CASA, please email us (amsr@jb.man.ac.uk plus James if he is willing) if you encounter any difficulties.

Note that CASA comes with its own internal Python installation. You do not need to know any python beforehand to use CASA.

You can test the installation on a script by starting CASA and then typing execfile('ngc5921_demo.py
')

This will suffice to show whether it is working and whether the plotter (for visibility data and calibration) and the viewer (for pixellated images) appear OK.

However, when at the Workshop, and when teaching yourself, try working through the script by cutting and pasting a few lines at a time, so that you can make sure you understand each step in your own time, view the data in moree detail and test the effects of altering input parameters.

CASA download: Latest stable version : http://casa.nrao.edu/betarelease.shtml **Make sure you have the
8115 revision tar balls!**
Students should also download the cookbook (link on the left of that page).
Unpack CASA and add its location to your PATH as per the instructions or as you perfer.
The VLA sample scripts and some data can be found inside the CASA installation tarball: e.g. if you dowload
casapy-24.0.8115-001.tar.gz
you will find:

NGC 5921 - basic demo:
casapy-24.0.8115-001/data/demo/NGC5921.fits
casapy-24.0.8115-001/lib/python2.5/regressions/ngc5921_demo.py

Jupiter example:
casapy-24.0.8115-001/lib/python2.5/regressions/jupiter6cm_demo.py

but data-set (filename = planets_6cm.fits) from : http://casa.nrao.edu/Data/VLA/Planets6cm/
This covers flagging, polarization calibration and self-calibration of continuum VLA data

(Other **BIMA and VLA example** scripts are also inside CASA and the data are available from http://casa.nrao.edu/Data/

MERLIN example and **ATCA example**: **!!!! Change in ftp address !!!!**
ftp://ftp.jb.man.ac.uk/pub/amsr/MWA/
with subdirectories for MERLIN AIPS and CASA

Please download them (even if we don't use them at the school because they contain examples of the typical parameters to use for these arrays and in the case of CASA this is not documented anywhere else). A printable version of ngc5921_demo.py: ngc5921_demo.py
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