In the Thursday hands-on session, we will cover VLBI data reduction. As an example, we will use a survey observation of the MOJAVE program.

The session will be split in two parts:

1) Calibration and fringe fitting in AIPS

****update**** The presentation on VLBI Data Analysis can be downloaded here: VLBI Data Analysis .

Data from the experiment BR122B at 5 GHz (C-Band) (study of the flare in the AGN CTA102), carried out on June 8th, 2006. Data can be downloaded from the VLBA archive:

https://archive.nrao.edu/archive/archiveproject.jsp

Just type:
Project (Proposal) Name: BR122
Telescope: VLBA
Observe Start Date: 2006-jun-8
Observe Stop Date: 2006-jun-8

Then download the file with label
VLBA_BR122B_LPOL8IF8MHZ16CH_4.9605GHZ04.uvfits (124636 kB)

The file will be available as:
ftp://ftp.aoc.nrao.edu/e2earchive/VLBA_BR122B_LPOL8IF8MHZ16CH_4.9605GHZ04.uvfits

Before lunch break, we will explain the data structure and start the pipeline VLBARUN within AIPS and its related subtasks for the complete VLBA calibration. After the lunch break, we will have the output ready for part 2 of the session, but we will spend 90min on explaining the individual steps performed by the pipeline (which need to be made by hand if something is non-standard).

2) Hybrid imaging in difmap

****update**** M. Kadler's list of important difmap-commands: difmapcheat.pdf

In addition to the CTA102 data from part one, we will provide 3 precalibrated data sets from the 15 GHz MOJAVE programme monitoring of AGN with the VLBA) with different structure: 3C84 (bright double sided source), NRAO 140 (one-sided jet), and NRAO 512 (compact source). Data sets can be downloaded from the MOJAVE web page:

http://www.physics.purdue.edu/astro/MOJAVE/allsources.shtml

Pre-calibrated (aips output) data are available here:
3C84:
ftp://ftp.mpifr-bonn.mpg.de/outgoing/ros/mwschool/0316+413.u.2009_01_30.uvf_raw.gz
NRAO 140:
ftp://ftp.mpifr-bonn.mpg.de/outgoing/ros/mwschool/0333+321.u.2009_03_25.uvf_raw.gz
NRAO 512:
ftp://ftp.mpifr-bonn.mpg.de/outgoing/ros/mwschool/1638+398.u.2009_01_07.uvf_raw.gz

We will read the data into difmap and examine their structure. Data will be plotted in several ways, averaged in time and edited. Students shall learn the CLEAN algorithm and exercise the application of phase self calibration first. After this, amplitude self calibration will be applied in steps. We will produce a final self-calibrated image. Basic steps are described in the difmap cookbook (see ftp://ftp.astro.caltech.edu/pub/difmap/cookbook.ps.Z).

Final self-calibrated data are available here:
3C84:
http://www.cv.nrao.edu/2cmVLBA/data/0316+413/2009_01_30/0316+413.u.2009_01_30.uvf
NRAO 140:
http://www.cv.nrao.edu/2cmVLBA/data/0333+321/2009_03_25/0333+321.u.2009_03_25.uvf
NRAO 512:
http://www.cv.nrao.edu/2cmVLBA/data/1638+398/2009_01_07/1638+398.u.2009_01_07.uvf