

1. Use self-calibration on the VLA observations of 4C +72.26 at 5 GHz to obtain a better continuum image. Hint – Start with the file 4C +72.26.TBC0 (created by me with SPLIT after calibrating the multi-source run), and run IMAGR to make an image with 1024 x 1024 pixels and 0.06 arcsec/pixel, then CALIB to use that image and make a new (u,v) data set which you should call 4C +72.26.TBC1. Start with phase self-cal only (solmode='p') and only after the image isn't getting any better should you switch to amplitude and phase selfcal (solmode='a&p'). Since the data is sparse you will want to provide IMAGR with support (boxes). You should use the tutorial handout (AIPStutorial.pdf) which contains some excerpts from the AIPS cookbook. If needed you can also consult the AIPS cookbook (<http://www.aips.nrao.edu/cook.html>). As you go along answer the following questions for 4C +72.26 at 5 GHz:
  - a) Make a plot of amplitude vs (u,v) distance.
  - b) What is the expected thermal noise? (by hand or with VLA calculator)
  - c) Measure the noise (measured off source using task IMEAN) of your initial image. Can you reach the thermal noise, and if not, why not?
  - d) With a short observation it helps a lot to provide support. Do this by defining clean boxes in IMAGR. You can define them using TVBOX with nbox=2 or 3 or however many you need to describe the source(s). What are the dimensions of your first box?
  - e) Is there any bad data? If so describe the time(s) and antenna(s) affected.
  - f) Show the progression of the peak flux, total cleaned flux (based on the total flux in all clean components), rms noise, and dynamic range (peak/noise) in the image. You should do at least 2 phase-only and 2 a&p iterations.
  - g) Use JMFIT to fit a Gaussian to the brightest source. Report the flux, size, and position for the source(s). Compare the derived position to the observed position.
  - h) Did you find any structure?
  - i) Provide two different estimates of the flux density of 4C +72.26: (1) from the sum of the clean components and (2) using a box in the image plane using IMEAN.
  - j) Compare to the Wide-field Infrared Survey Explorer (WISE) 5 micron image 4C7226WISE2.HGEOM that you will find in your image catalog. Can you draw any conclusions about the nature of this source?
  - k) Make contour plots of your best Stokes I image and turn in a hardcopy. Best image gets +5 points. Better image than mine gets +10 points.