INTERFEROMETRY and ALMA BASICS

Give a short definition of:
• interferometer
• visibility (main properties, point like and extended sources)
• aperture synthesis
• baseline
• angular resolution
• field of view
• sensitivity
• maximum recoverable scale

Concerning ALMA, provide:
• number of antennas, arrays bands, polarization, and bandwidth
• baseline max, min and MRS, angular and spectral resolution
• search in the website the more extended and compact configurations
• use the sensitivity calculator to estimate the sensitivity to detect one of your source
• use the ALMA science archive to search and download data for one of your target

Optional
For Pictor A:
• search ALMA archive data
• using NED literature and ALMA archival information, estimate the MRS, size, sensitivity to detect the core in all bands
**APSYNSIM UV simulator**

Ivan's code is available in: [https://launchpad.net/apsynsim/trunk/1.2b.](https://launchpad.net/apsynsim/trunk/1.2b)

More source and array models here [http://www.ira.inaf.it/~liuzzo/UniTO/](http://www.ira.inaf.it/~liuzzo/UniTO/)

To launch it, e.g.: `cd APSYNSIM_v1.2b_POSIX/SCRIPT/ casapy -c APSYNSIM.py`

**Hands-on**

1) Model = Point_center; Array = 2 antennas
   - set snapshot observation
   - add antennas (up to 6)
   - change the observing time (H: -5 to 5)
   - change the wavelength
   Notice the differences, e.g. In dirty beam

2) Model = 2_points; Array: the 6 antennas just created
   - moving antennas to short distances ~ 300 m: the 2 sources are unresolved
   - with bl > 600 m the two sources are resolved
   How the detection of sources changes?

3) Model 2Points and gaussian; Array: the same as before
   - start with the extended array
   - move the antennas closer to recover the extended emission
   - alma 3.6 configuration
   - a more compact alma configuration (ACA + alma cycle 1)
   When the extended emission starts to be recovered?
   In which configuration and what sources are filtered out and resolved?

4) Model: Face-on-galaxy; Array: ALMA cycle 3.6
   - diffuse emission filtered out completely
   - the more compact cycle 3.4
   - ACA + alma cycle 3.4
   How is the diffuse emission in the ALMA cycle 3.6? and in the other configurations?

5) optional
   Model: Radio galaxy; Array: VLA
   - different VLA configurations as before
   - change the wavelength and observe with alma different configurations
   Notice the differences.