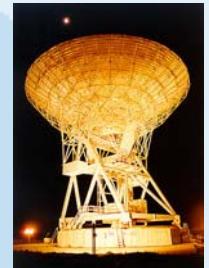
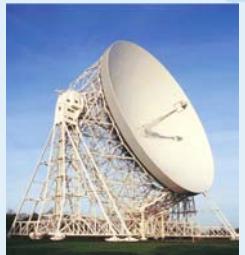


# RadioNet: Advanced Radio Astronomy in Europe



RadioNet is an Integrated Infrastructure Initiative funded by the EU through Framework Programme 6



Activities in mm/submm astronomy

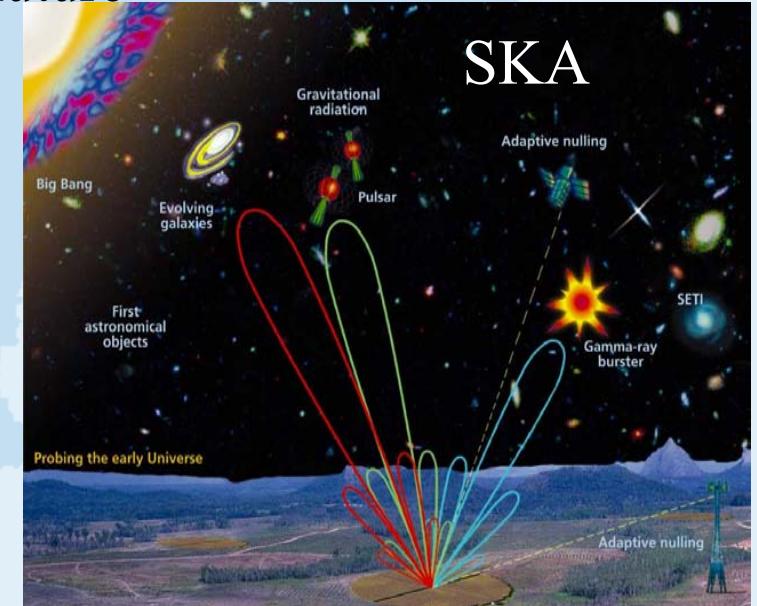
# Partners and mission

- RadioNet has 20 partners: all of the major radio astronomy facilities and the laboratories involved in technology development.
- Coordinated by the University of Manchester, UK.
- Remit is to support the European astronomy community and to enhance the European radio astronomy facilities.
- RadioNet was awarded €12.4M by the EC.



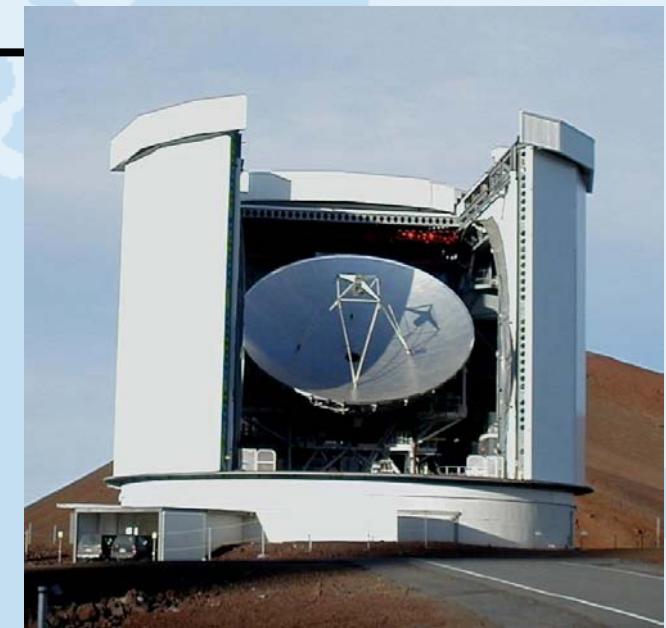
- Europe has some of the largest radio telescopes on Earth. These facilities are working together more closely than ever under the RadioNet umbrella.
- Telescopes:
  - European VLBI Network (EVN) is the most sensitive VLBI array on Earth.
  - **IRAM: runs Plateau de Bure (FR) and Pico Veleta (ES: largest mm dish in world);**
  - **JCMT in Hawaii, largest sub-mm capable dish in world;**
  - MERLIN: UK's 7-telescope array, being upgraded using fibre optics.
  - MPIfR – Effelsberg (DE) 100-m; 2<sup>nd</sup> largest steerable dish in the world;
  - **OSO-20m; highly capable mm dish in Sweden;**
  - WSRT – recently upgraded, 14 –element interferometer in NL

- RadioNet has three Joint Research Activities:
  - ALBUS: developing advanced software for interferometers
  - AMSTAR: developing new mm-wave devices
  - PHAROS: developing focal plane phased-arrays
- Networking – linking the scientists, engineers and the next generation:
  - 6 networking activities: science, engineering, software, ALMA, spectrum management; planning for the future



# The JCMT

- Telescope:
  - Diameter 15m, surface accuracy  $24\mu\text{m}$
  - Altitude 4092m, summit of Mauna Kea
- Instruments:
  - SCUBA: imaging bolometric array for continuum observing at  $450\mu\text{m}$  &  $850\mu\text{m}$
  - Three heterodyne receivers for line observing (230,345,460/690 GHz)
- Funding:
  - Tripartite partnership:
    - United Kingdom 55%
    - Canada 25%
    - Netherlands 20%



- Objective:
  - Completely replace the current suite of instruments by 2006/7
  - New instruments will be optimised for wide-field astronomy
  - Comprehensive JCMT Survey Programme is currently being developed by JCMT observing communities in the partner countries
  - JCMT will be complementary to ALMA, providing zero-spacing large-area maps
  - Will also collaborate with CSO and SMA to perform limited submm interferometry beginning in 2005

- New instrumentation suite:
  - ACSIS: multichannel backend spectrometer Dec 2004
  - HARP-B: heterodyne array receiver at 350GHz Apr 2005
  - ROVER: polarimeter for use with HARP-B Dec 2004
  - SCUBA-2: next-generation bolometric imaging photometer, 450 $\mu$ m & 850 $\mu$ m, FOV >50 arcmin $^2$  May 2006
  - FTS-2: Fourier transform spectrometer for imaging spectroscopy with SCUBA-2 2007
  - POL-2: polarimeter for imaging polarimetry with SCUBA-2 2007

# The IRAM Telescopes



Pico Veleta 30-metre  
Since 1985



Plateau de Bure Interferometer  
1990: 3 antennas  
**2002: 6 antennas and long baselines**

## SENSITIVITY - FLEXIBILITY - FREQUENCY COVERAGE

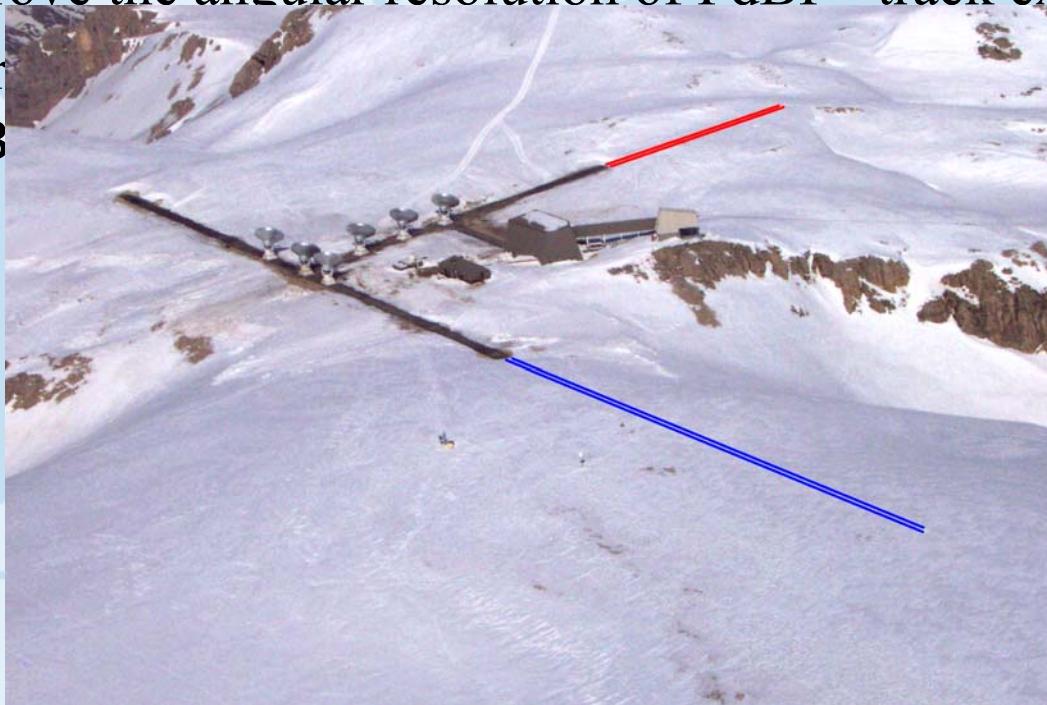
Heterodyne / Bolometer  
[3, 2 & 1mm] [1.2 mm]  
Polarimetry

Heterodyne  
[3 & 1 mm]

# Major technical improvements foreseen in the mid term

## Aims:

- Improve sensitivity and bandwidth: 4 GHz bandwidth, new SSB/2SB rcvrs; upgrade telescope surfaces; optical fibre data transport; new correlator at PdB, new IF processor at PV – factor of 2-5 improvement in sensitivity.
- Improve frequency coverage, polarisation capability
- Improve the angular resolution of PdBI – track extensions
- Improve the angular resolution of LAB



# On-going and new projects for 2003-2007

