The activity at Istituto di RadioAstronomia

4th ESTRELA Workshop - IRA(INAF) Bologna
January 19-22, 2009

IRA was an institute of National Council of Research (CNR) until 2004.
Starting on January 1st 2005, it was included in the National Institute of Astrophysics (INAF).
→ reference for radio astronomical studies in Italy

The aims of the Institute include:

- Scientific research →
  galactic and extragalactic radio astronomy, geodesy

- Technological research →
  design and fabrication of radio instrumentation

- Management of the Italian Radio Astronomical facilities → 3 Radiotelescopes + 1 under construction

55 perm staff members
plus Univ. Prof.,
PhD students,
postdocs,
fellows,
undergraduate st.

Observing facilities : **Northern Cross Radio Telescope**

B2 and B3 catalogues of radio sources

Observing facilities : **Parabolic Antennas (32 m)**

Medicina : Freq. agility
Fiber optic

Noto:
Active surface
43 GHz rec.

Partecipation to: European VLBI Network, **EVN**
Joint Institute for VLBI in Europe, **JIVE**
Int. VLBI Serv.for Geodesy and Astrometry, **IVS**

Global VLBI (VLBA, GBT, VLA)
Spatial VLBI (VSOP,VSOP2,Radioastron)

EUROPEAN vlbi NETWORK

IVS

e-VLBI

The Sardinia RT

-Diameter: 64 m

-Frequency range :

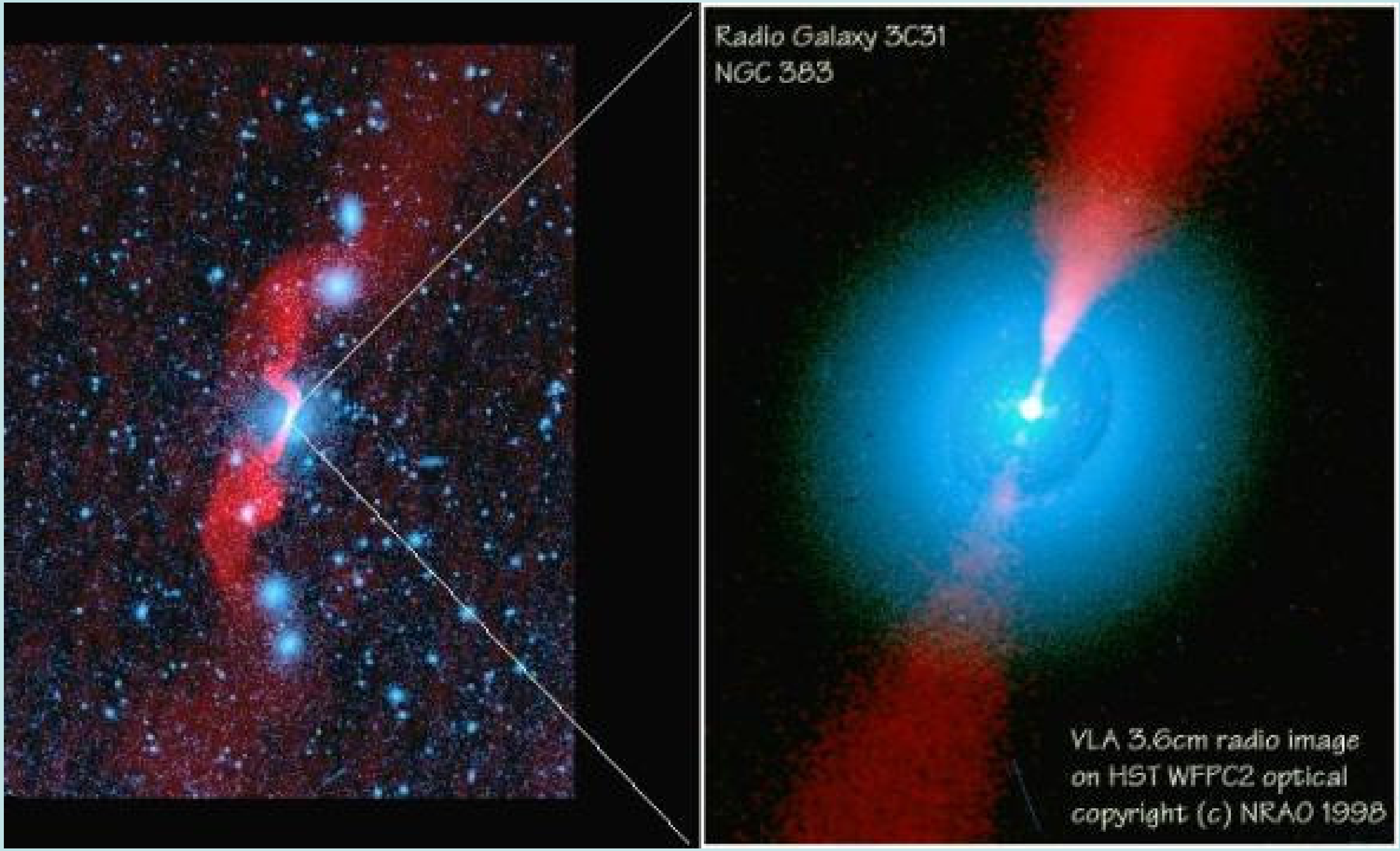
300 MHz – 100 GHz

Lines of Scientific Research

- **Extragalactic radio sources**

Observations with modern instruments in all bands

Large scale jets in low-power radio galaxies



Lines of Scientific Research

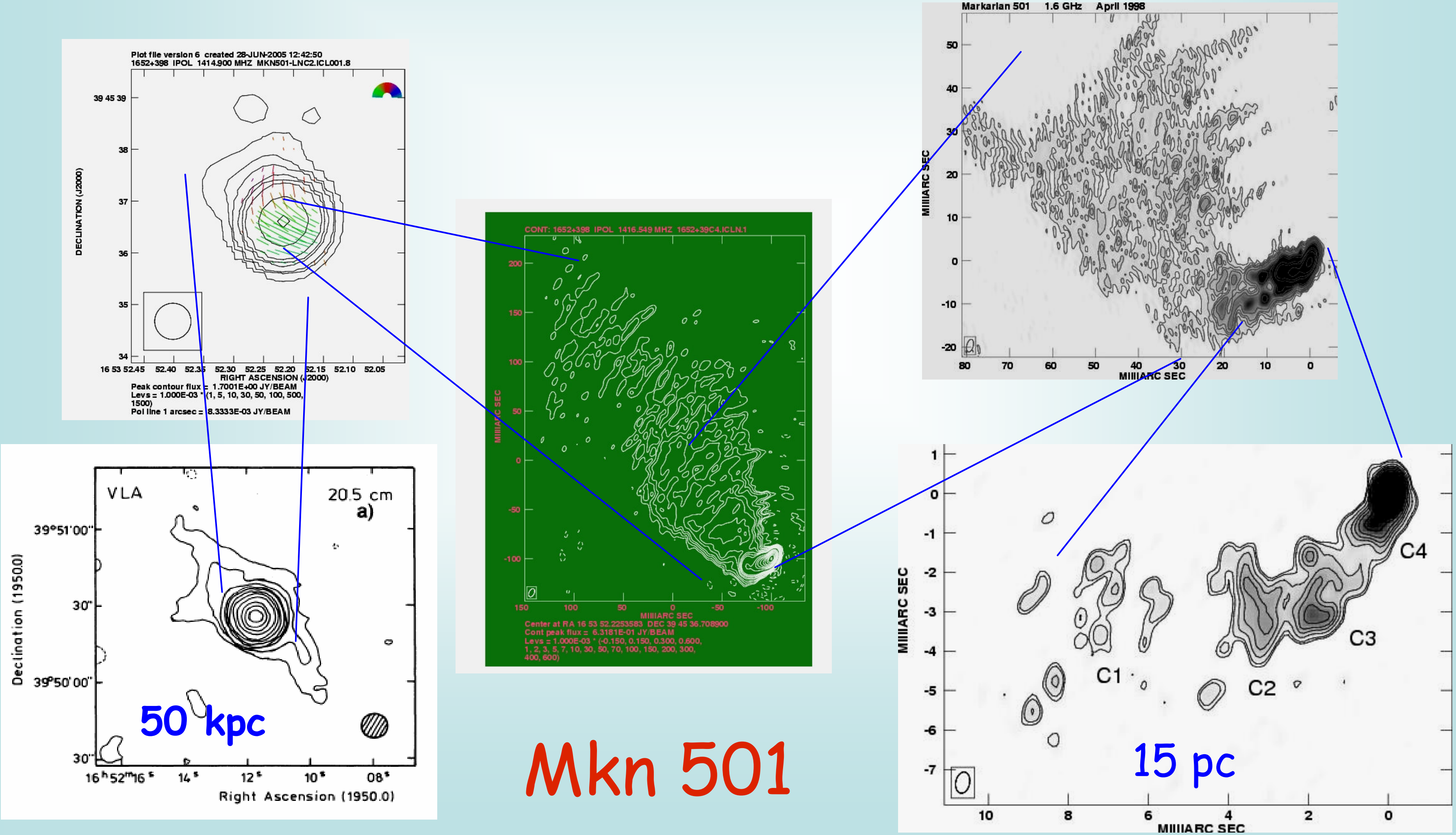
- **Extragalactic radio sources**
- **High resolution studies of AGN (VLBI)**

Observations with modern instruments in all bands

AGN : The youngest radio galaxies

The structure of relativistic jets

The cental engine in radio galaxies



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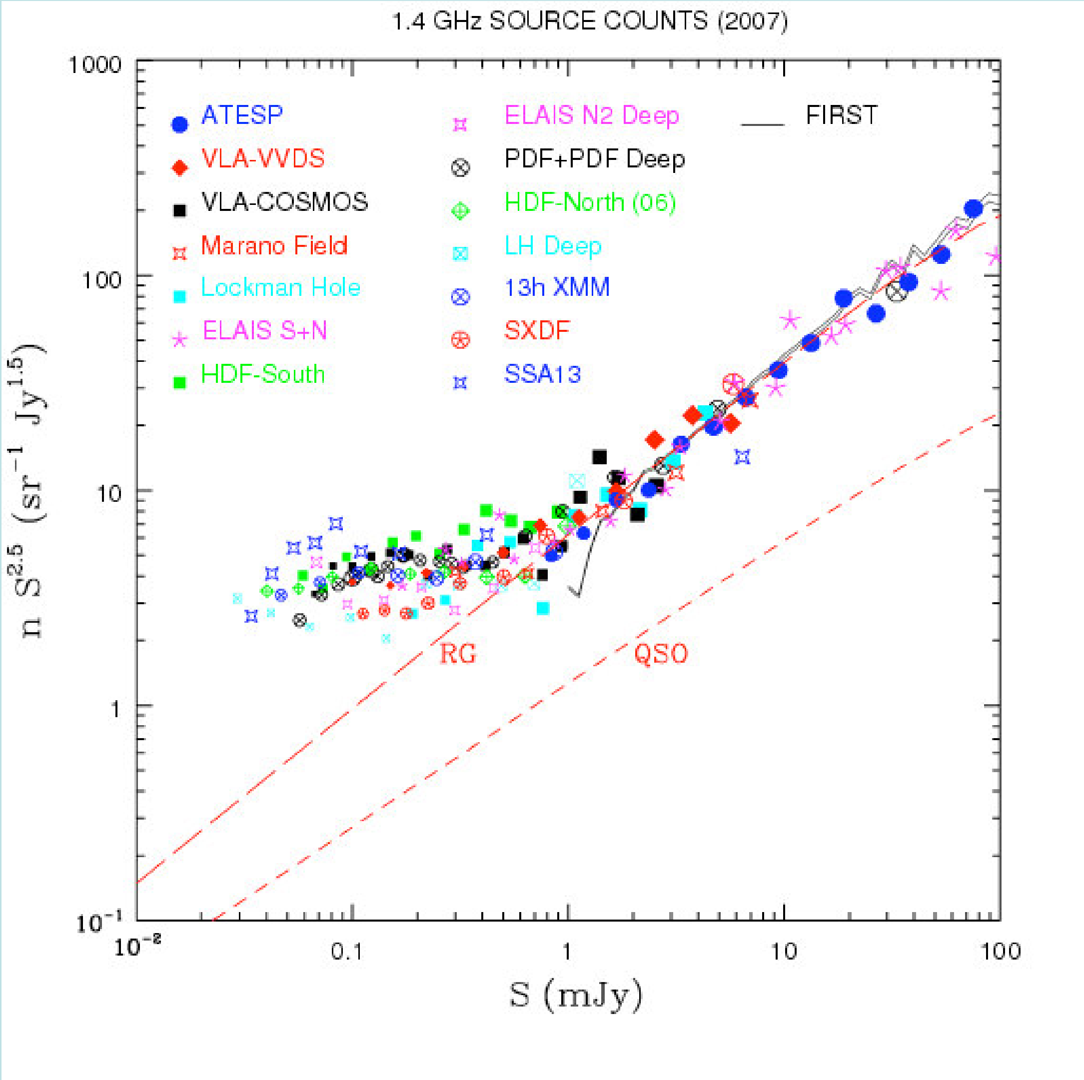
Lines of Scientific Research

- **Extragalactic radio sources**
- **High resolution studies of AGN (VLBI)**
- **Surveys (radio, optical, IR, X-ray, CMB)**

Observations with modern instruments in all bands



- Faint radio source population

- AGN, starburst

- 22 GHz at Medicina

- eMERLIN Legacy projects

Lines of Scientific Research

- **Extragalactic radio sources**
- **High resolution studies of AGN (VLBI)**
- **Surveys (radio, optical, IR, X-ray, CMB)**
- **Non thermal phenomena in galaxy clusters**

Observations with modern instruments in all bands

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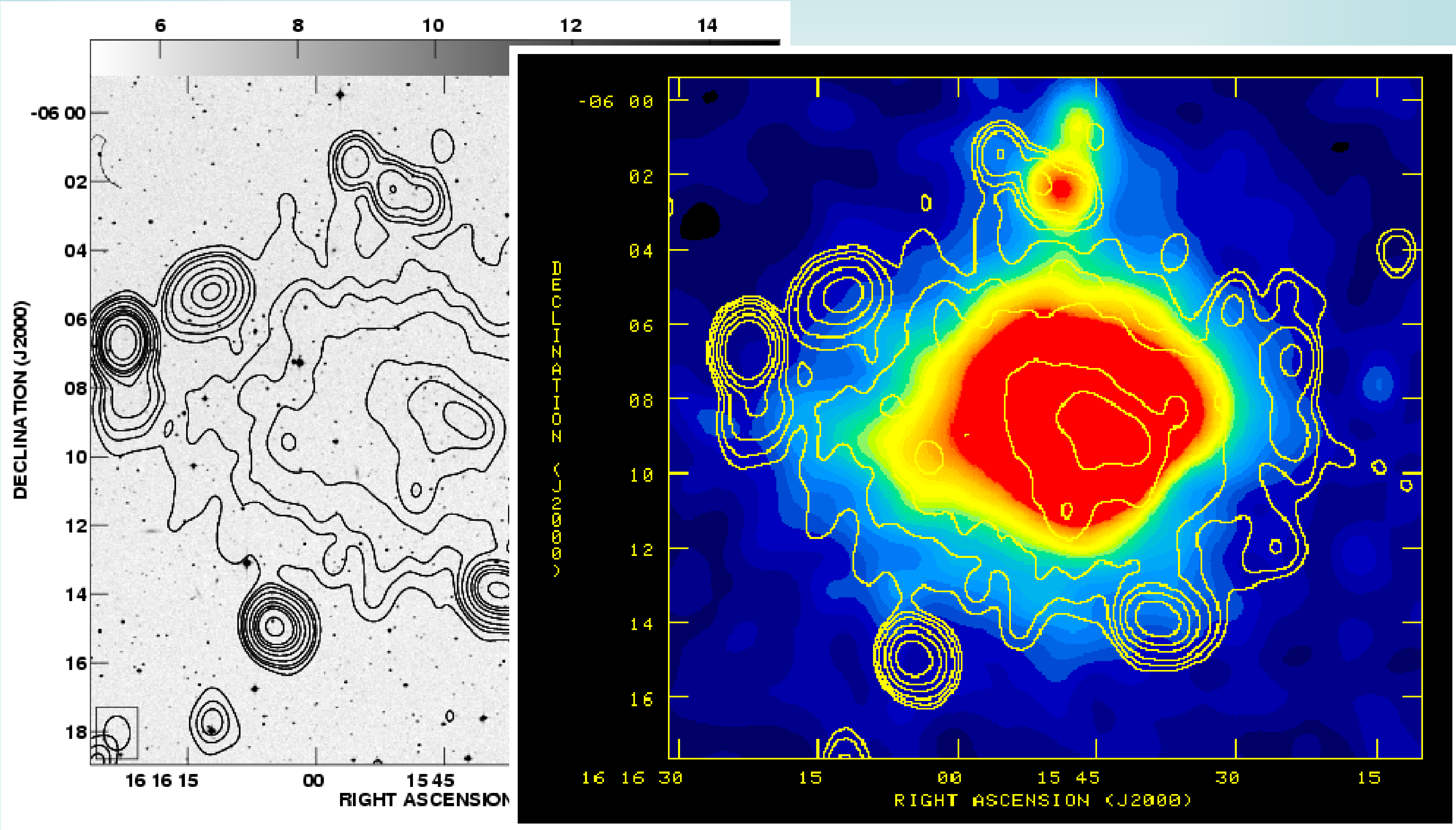
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DECLINATION (J2000)
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RIGHT ASCENSION
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DECLINATION (J2000)
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15 45
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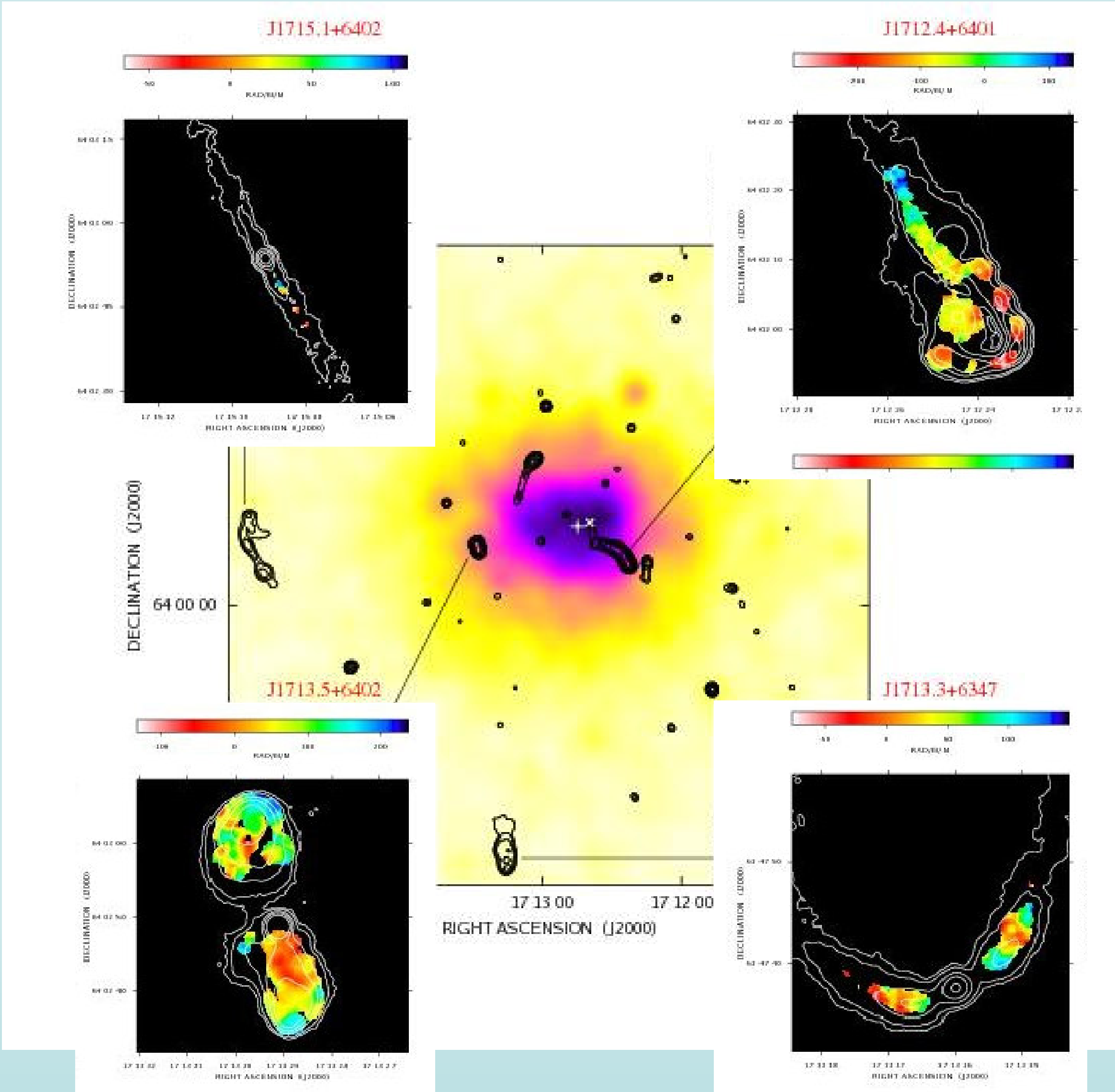
15
RIGHT ASCENSION (J2000)

Magnetic fields in clusters of galaxies



Govoni et al. 2006

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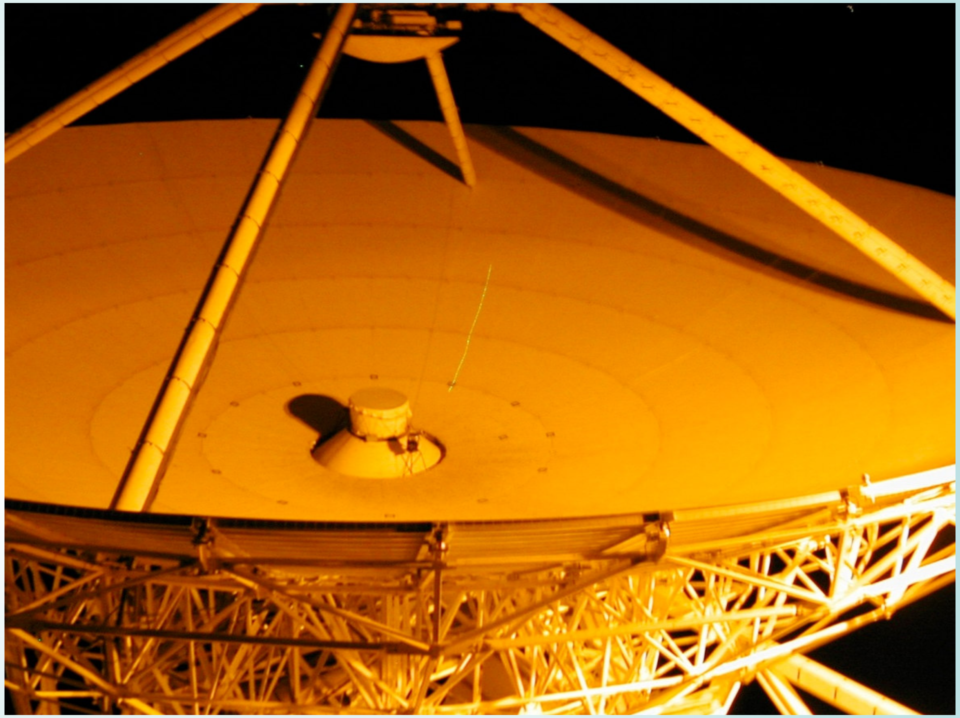
Lines of Scientific Research

- **Extragalactic radio sources**
- **High resolution studies of AGN (VLBI)**
- **Surveys (radio, optical, IR, X-ray, CMB)**
- **Non thermal phenomena in galaxy clusters**
- **Stars and star formation**
- **Theoretical developments**
- **Geodesy**

Observations with modern instruments in all bands

Geodetic activity



Laser beams

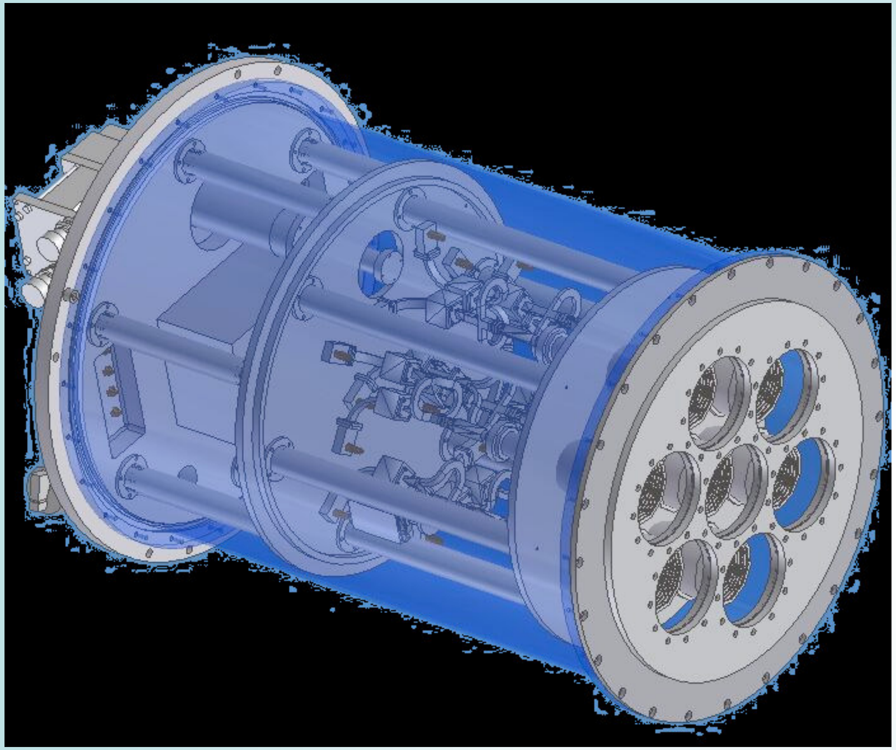
Local ties
(differerential coordinates)

Technological Research

- **Low Noise Amplifiers**
- **Wide Band Receivers**
- **Back-end/Front-end**
- **RFI mitigation**
- **Antenna data link**
- **Beam forming**

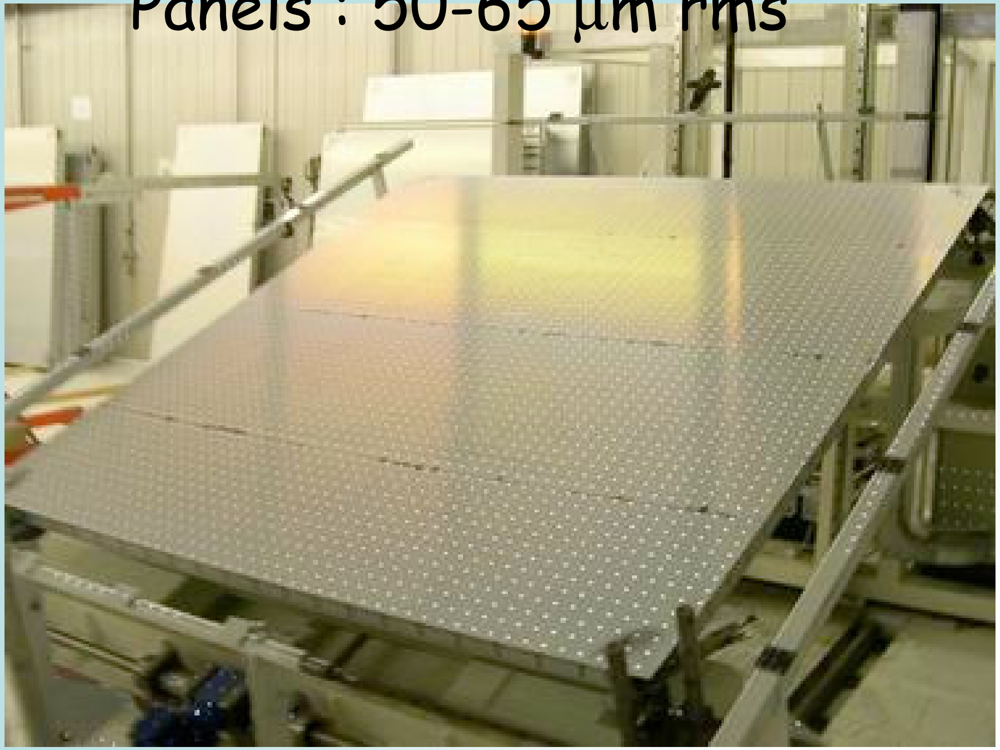
Digital technology : MMIC, FPGA
DBBC

Software : GRID



7-horn receiver, 19 – 26.5 GHz

Panels : 50-65 µm rms



Actuator

1116 Actuators connected

Projects

→ λ m/cm → **SKA**

eVLBI, SRT, LOFAR

→ λ mm/sub-mm → **ALMA**

VLBI mm, VSOP2, SRT, ARC

Synergy with other bands:

X-Ray : XMM, Chandra

gamma : AGILE, FERMI, MAGIC(2)

UE Projects:

EXPReS — VLBI

SKADS
MCCT-SKADS
PrepSKA — SKA

RadioNet
RadioNet — VLBI, Coordination, cm/mm Technology, Software, Science

ESTRELA

SIXTH FRAMEWORK PROGRAMME

SEVENTH FRAMEWORK PROGRAMME

Thank you