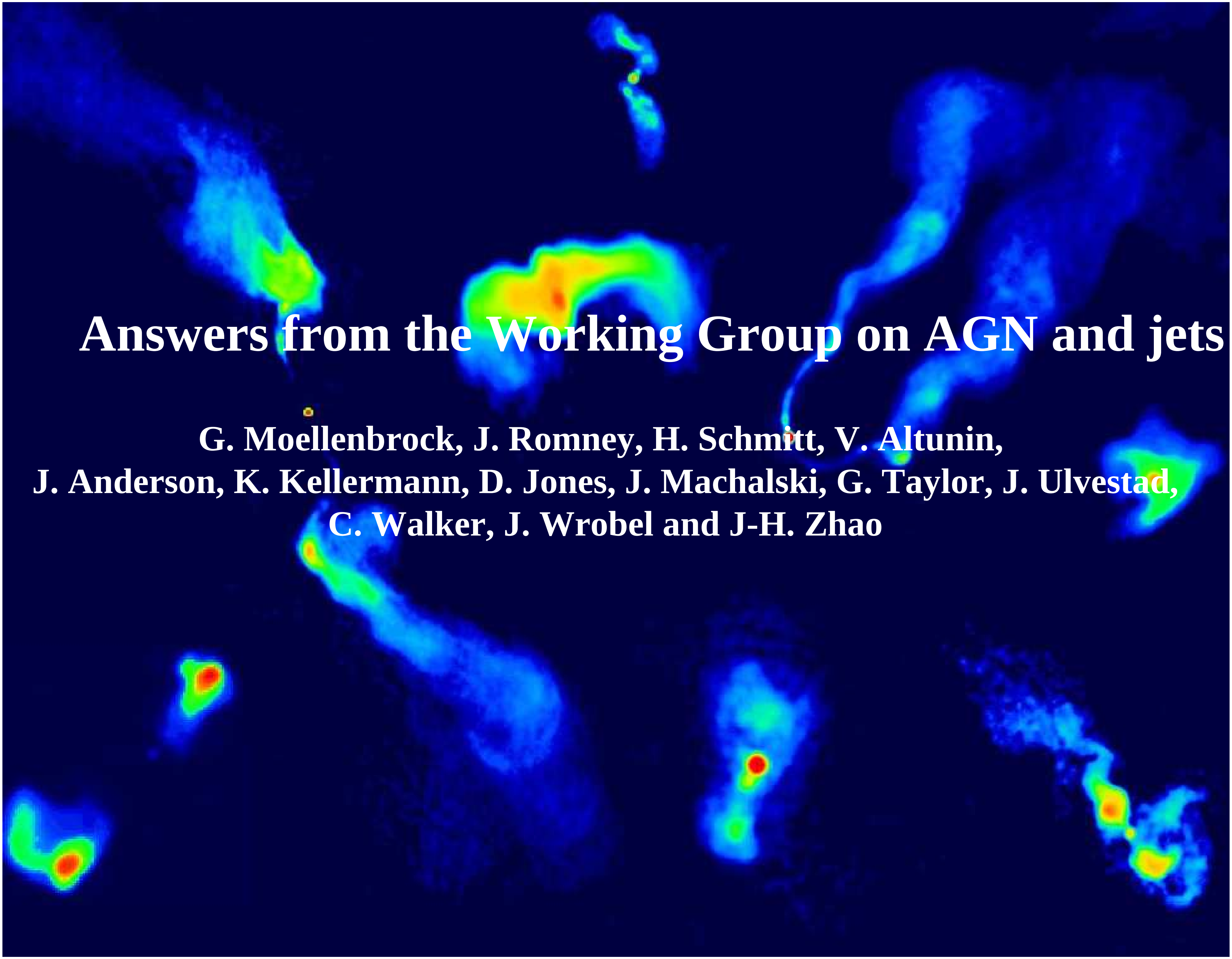


Answers from the Working Group on AGN and jets

G. Moellenbrock, J. Romney, H. Schmitt, V. Altunin,
J. Anderson, K. Kellermann, D. Jones, J. Machalski, G. Taylor, J. Ulvestad,
C. Walker, J. Wrobel and J-H. Zhao

I. The New Mexico Array (A+ Configuration)

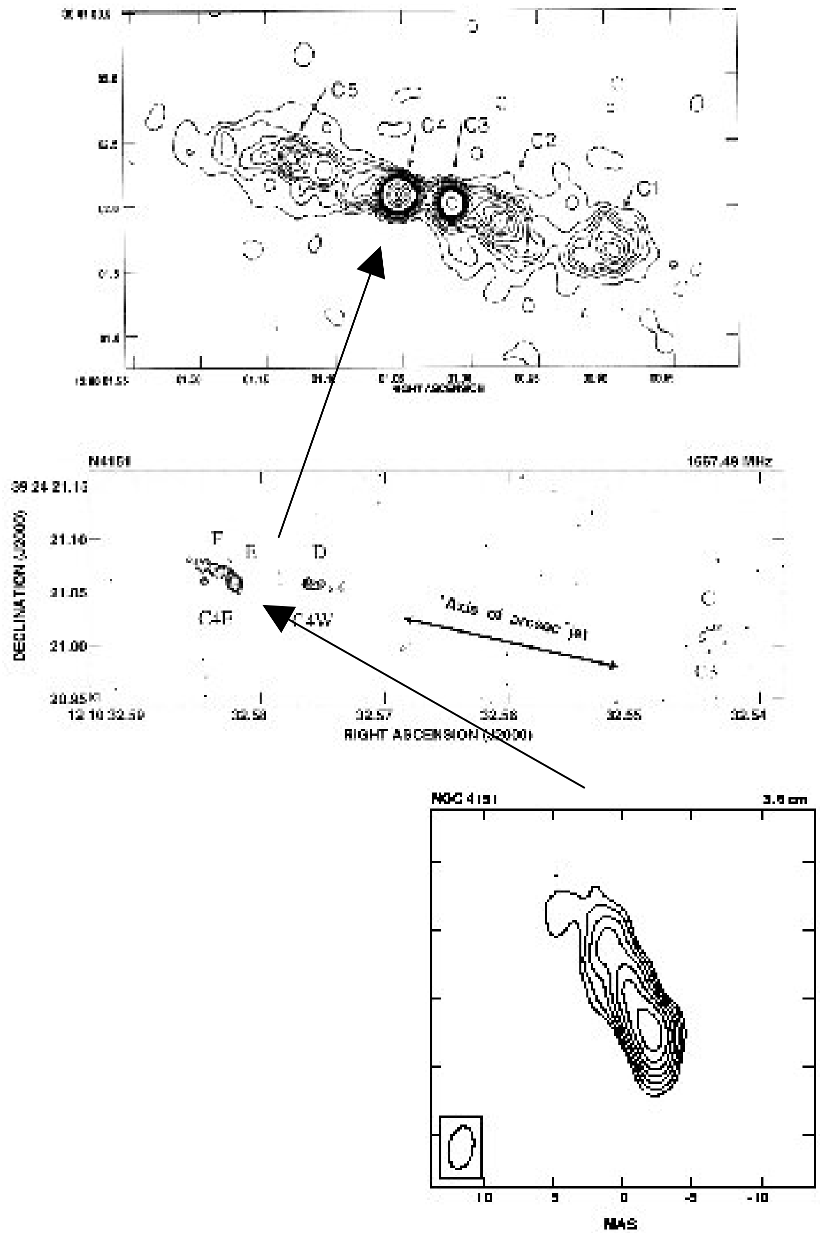
A. What are the key science drivers?

1) Tracing collimated flows from pc -> kpc
2) Monitoring projects with the NMA alone
3) Studies of the AGN environment
    3a) Faraday rotation
    3b) free-free absorption
    3c) HI absorption (and other lines)
4) Distinguishing AGN from starbursts

B. Should we build the NMA?

Yes!!! and FAST. Don't wait for cheaper technology.
We endorse an NMA finished with EVLA phase I

1) Tracing collimated flows from pc -> kpc

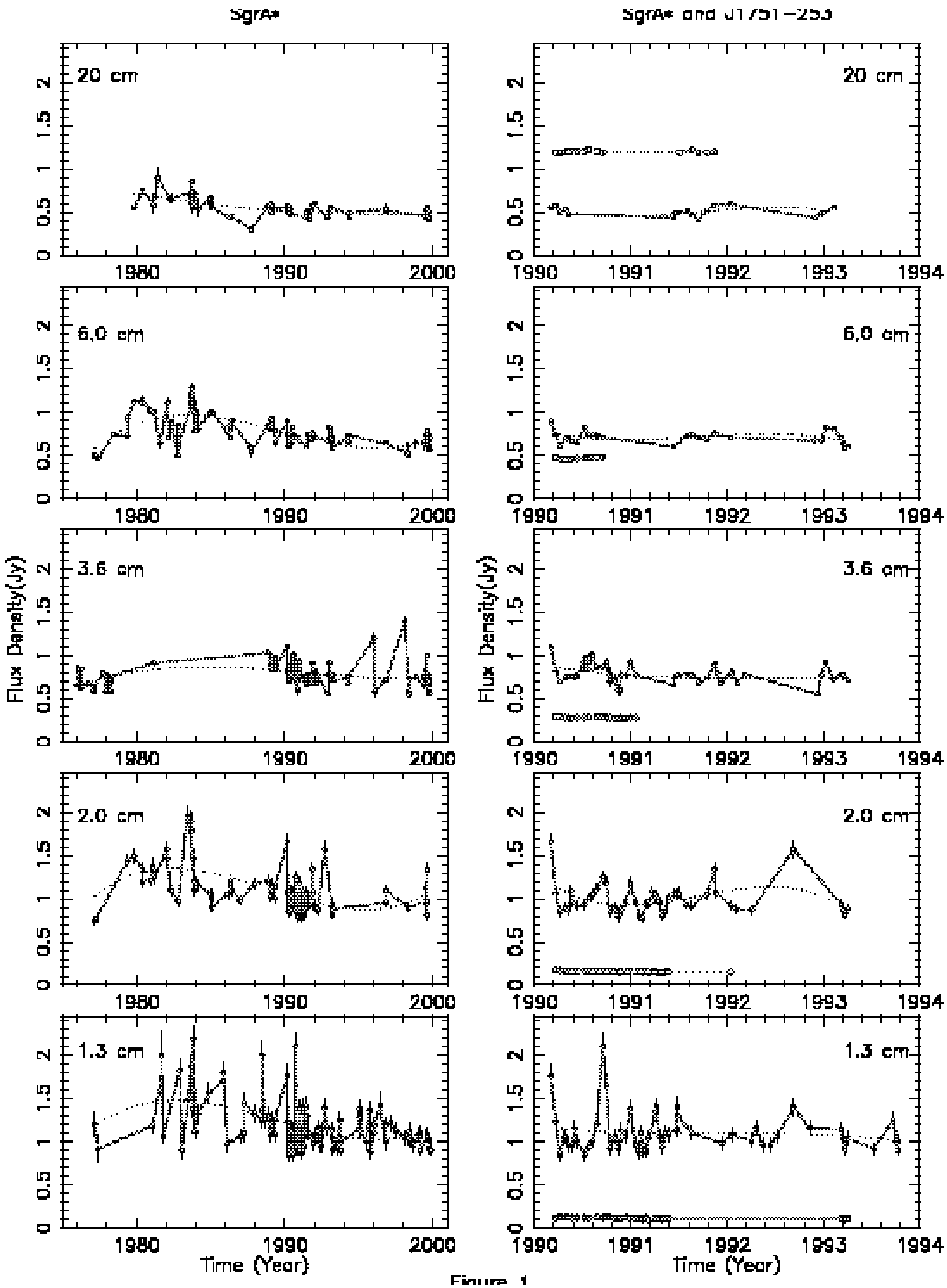


MERLIN+VLA
at 6cm

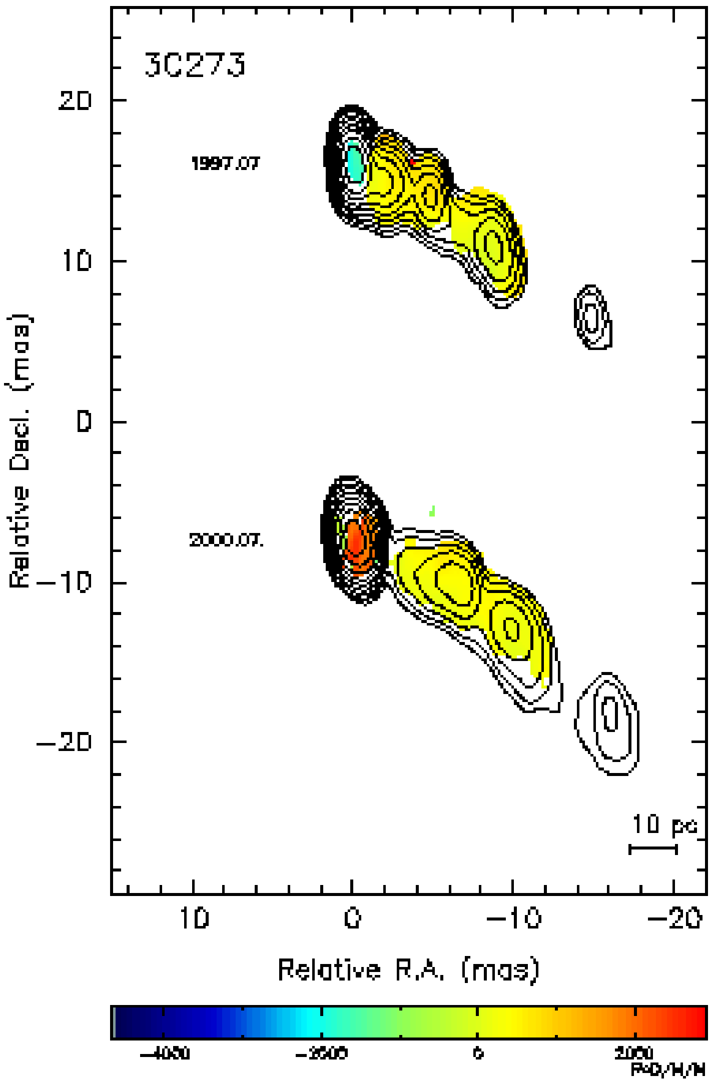
VLBA 18cm

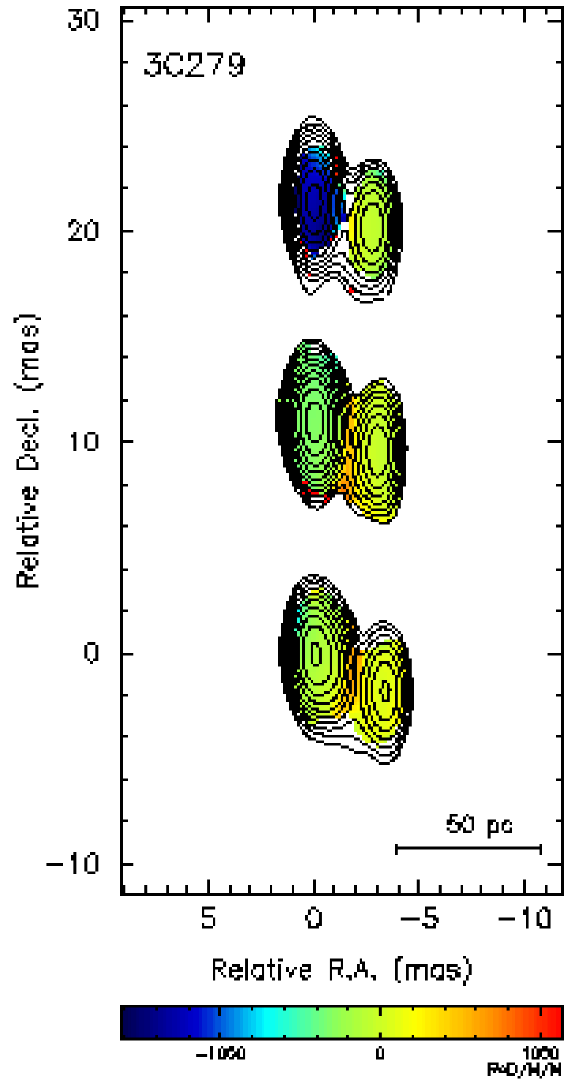
VLBA 3.6cm

2) Monitoring projects with the NMA alone

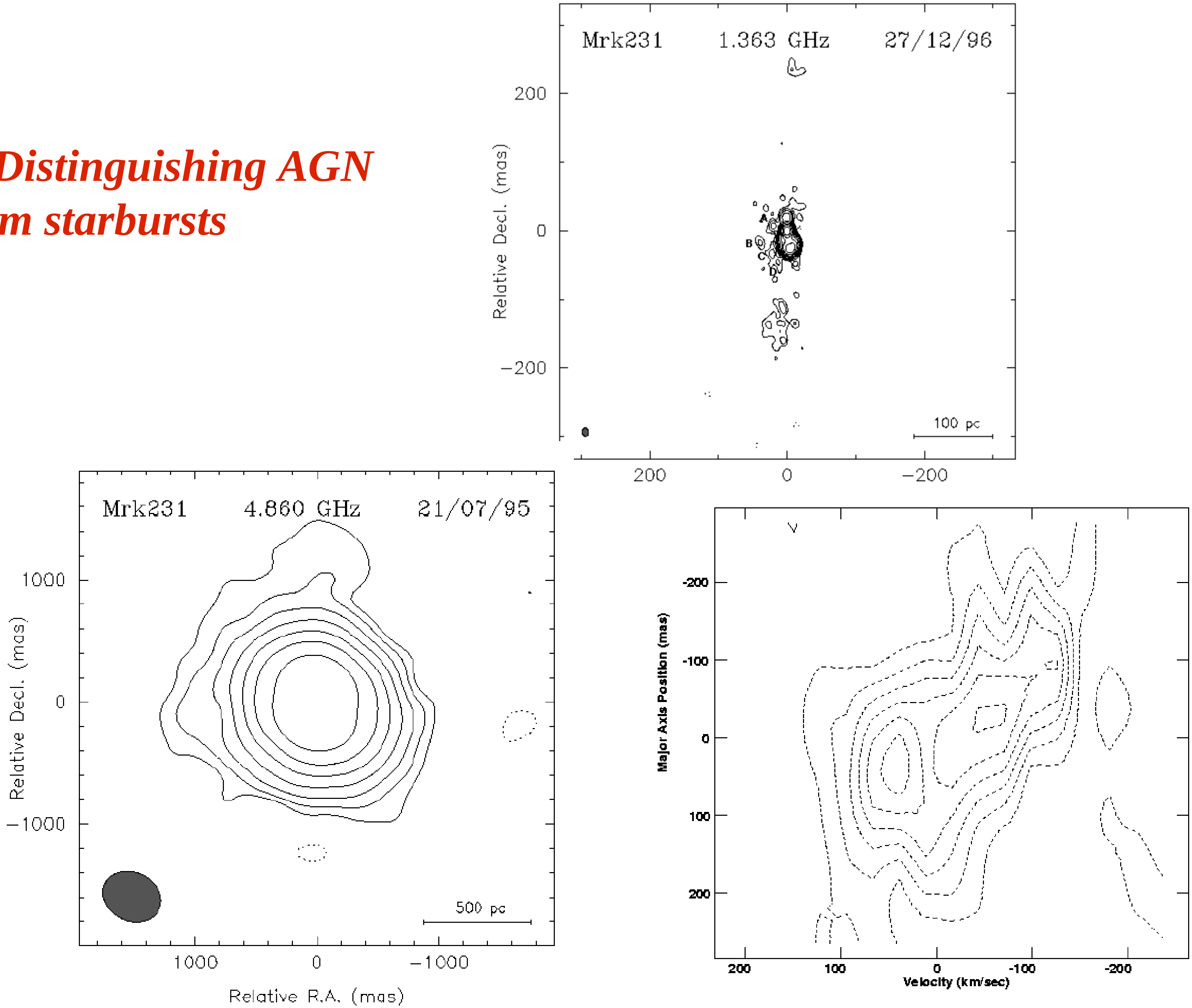


3) Studies of the AGN environment





4) Distinguishing AGN from starbursts



C. Is 8 the right number?

- We endorse 10 NEW antennas.
- We adopt the VLBA (10 stations, non reconfigurable) as an understood standard.

D. What is the required maximum frequency?

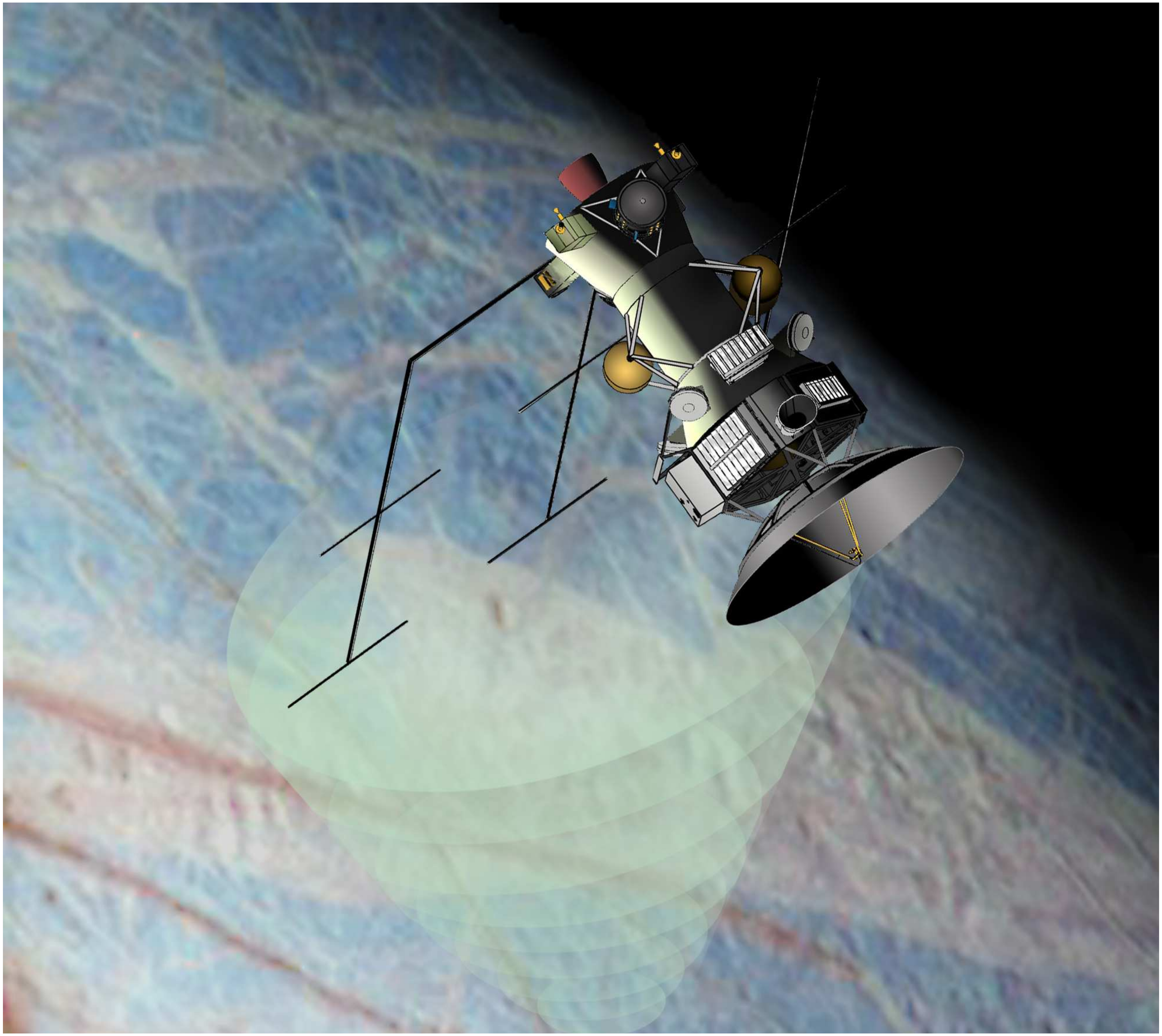
98 GHz. To exploit 3mm observing with the VLBA.

D2. Would you trade freq. for area?

No:

- We need 32 GHz capability for DSN
- The niche for VLA+NMA+VLBA may be at high frequencies

We need 32 GHz capability for DSN- e.g. Europa Orbiter



E. How important is a stand-alone NMA?

- Very important! We need sensitivity and imaging.
- For monitoring LLAGN and gravitational lenses

F. What field of view is required for NMA?

50 arcsec. Motion studies of jets and hot spots.

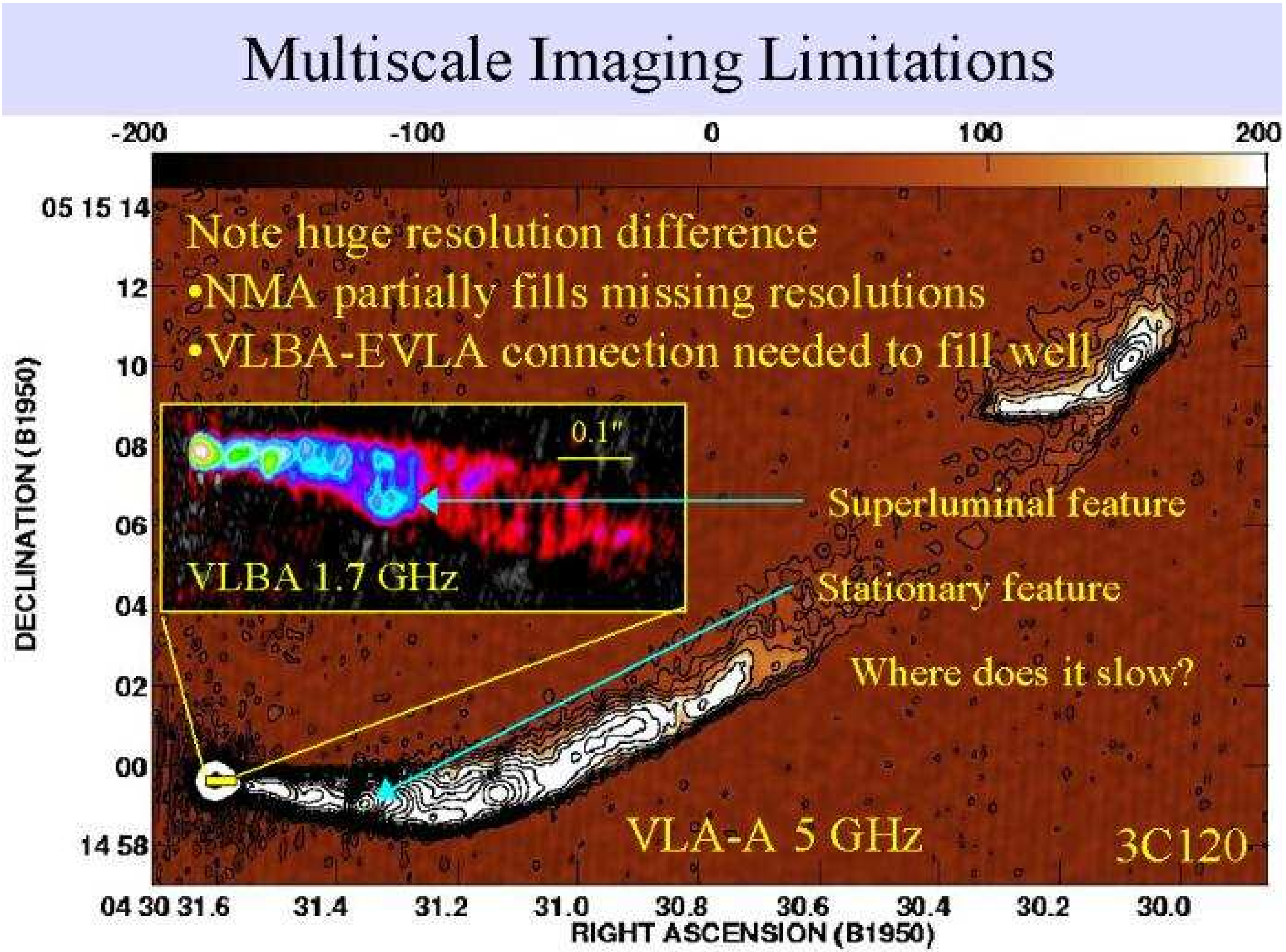
G. Ranking:

1. Get the NMA done as soon as possible using 25m dishes
2. Allow for a plug and play SKA prototype but don't wait

lower priority:

3. develop new technology for NMA
4. develop new technology for SKA

Motion studies of jets.



II. Integrating the VLBA with the EVLA

A. How far should we go?

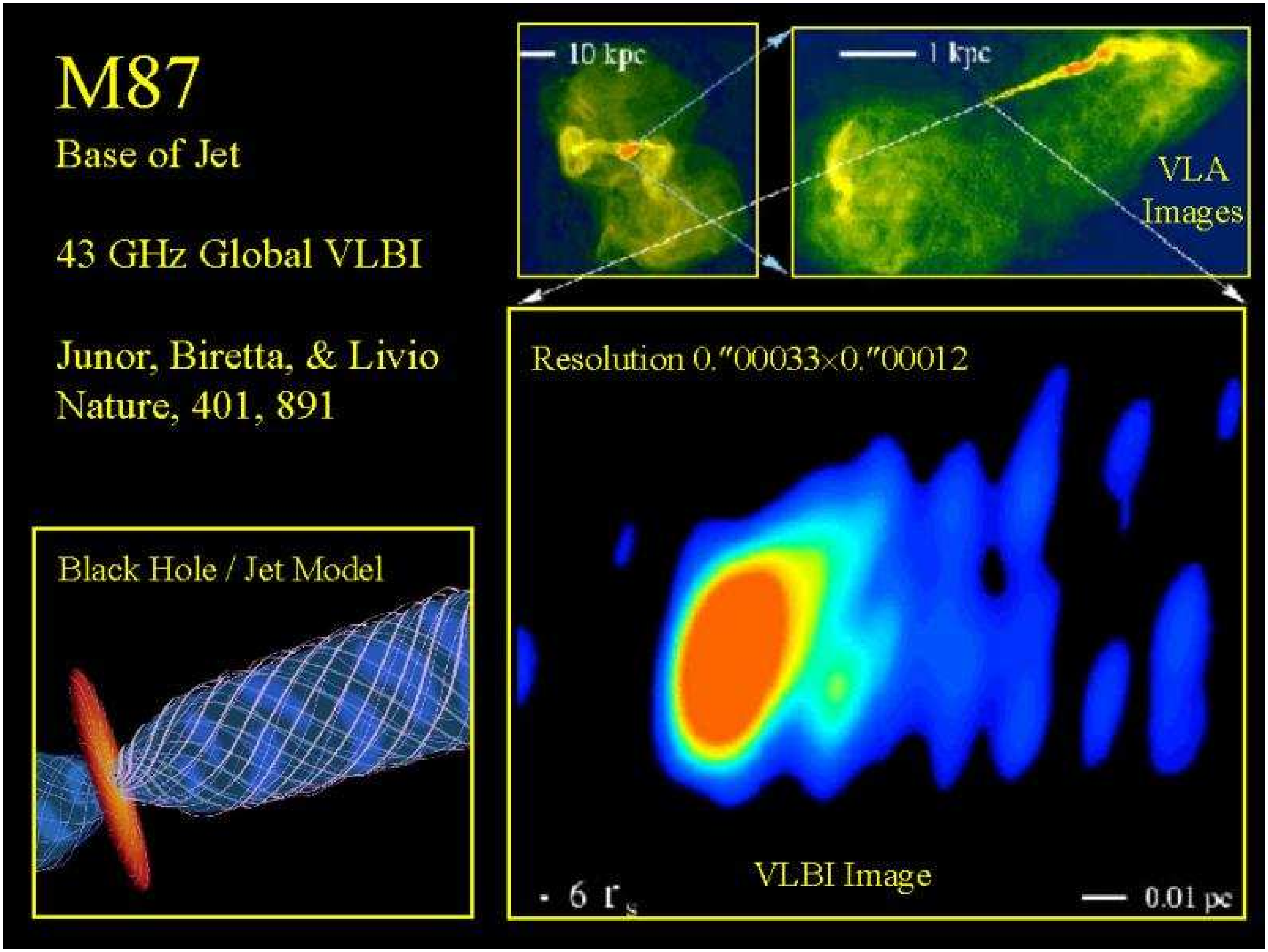
ALL THE WAY! Wide Band (8 GHz/poln)
costs $15 M

The VLBA has opened up the sky to the mJy population at 8 GHz and below

Full bandwidth will allow 7mm and 3mm phase ref.

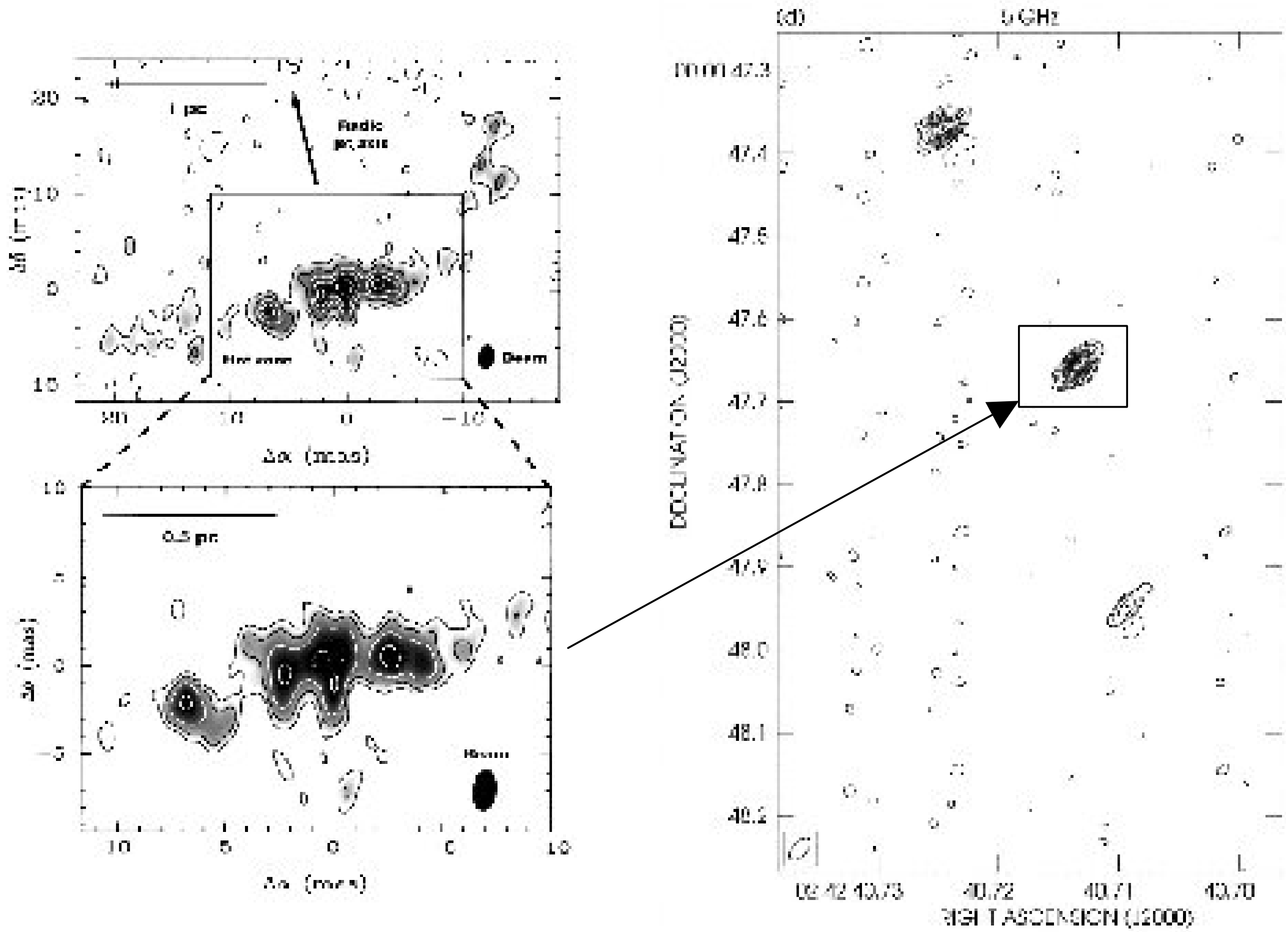
key science: Study black hole environment

Observe collimation, polarization and absorption in AGN



Looking for an accretion torus

NGC 1068



III. The E configuration

A. What are the key science drivers?

- Relic and Halo sources, Large Radio lobes
- Constant spectral index imaging to large scales

B. Should we build it?

- Sure

B2. What approach?

300 m max spacings, 15 new pads. Kogan E3

C. How important is shadowing?

- Make the E3 configuration elliptical, optimizing for sources at zero declination.

D. What freq range is required?

1 - 50 GHz

IV. Low Frequency Expansion (300 -1000 MHz)

A. What are the key science drivers?

- HI and free-free absorption in AGN at moderate redshifts
- Matched resolution

=> VLBA and NMA could have prime focus feeds at low cost

B. Should we provide it?

- Yes on NMA and VLBA, lower priority on VLA
- Don't damage high freq. performance of VLA

C. What frequencies must be covered?

- 250-1000 MHz. Dovetail with LOFAR, EVLA L Band

V. Connections to other initiatives

A. What should be the plan for radio astronomy

See Table

B. How should EVLA relate to LOFAR?

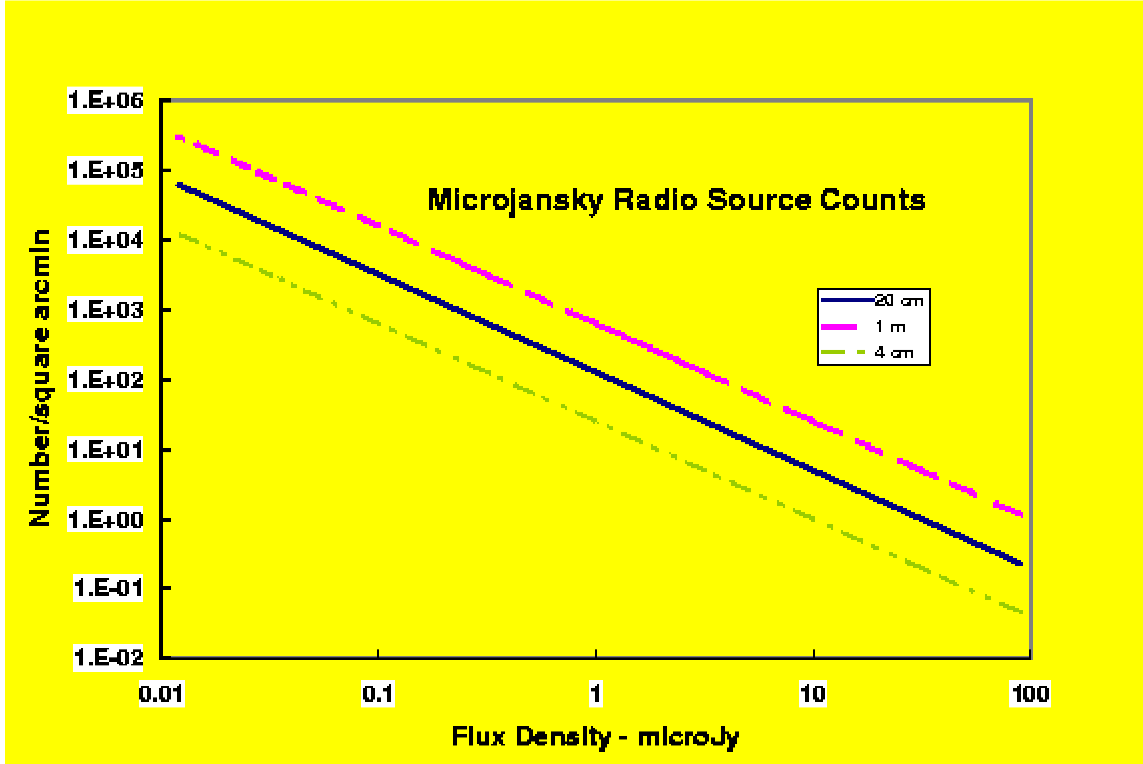
- Frequencies should dovetail at 250 MHz
- Share stations/fibers, site development, software

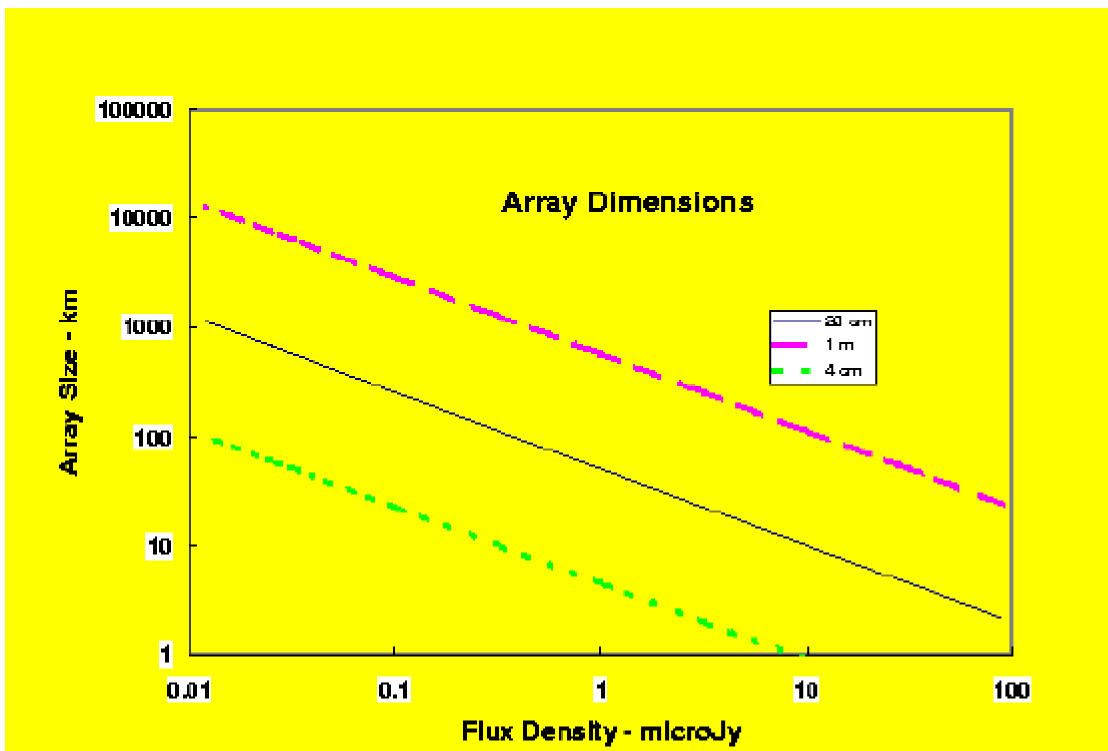
C. How should EVLA relate to the SKA?

- Train the next generation of SKA users.
- Provide the high-frequency component of SKA
- Investigate sub-microJy source population

Radio Astronomy and the EVLA

2002 SMA operational
2005 Start construction of NMA
2005 Wideband (8 GHz) retrofit at LA and PT
2005 Finish CARMA
2005 Finish eMERLIN
2006 Finish ATA
2006 Deploy LOFAR, possibly sharing stations/fiber with NMA.
2007 Complete prototype US SKA station
(as plug and play element of EVLA)
2007 Deploy E2E data pipeline. Prototype for SKA?
2009 Present SKA and BHI to decade committee
2009 Launch VSOP2
2010 Finish ALMA
2010 Finish EVLA including NMA and VLBA integration
2010 Kristy gets tenure.
2012 Complete SKA prototype array
2020 Complete SKA
2020 Launch space vlbi array (BHI)


Microjansky Radio Source Counts
Number/square arcmin
1.E+06
1.E+05
1.E+04
1.E+03
1.E+02
1.E+01
1.E+00
1.E-01
1.E-02
0.01
0.1
1
10
100
Flux Density - microJy
20 cm
1 m
4 cm


Array Dimensions
Array Size - km
100000
10000
1000
100
10
1
0.01
0.1
1
10
100
Flux Density - microJy
20 cm
1 m
4 cm