

EVN12 Conference summary

Huib van Langevelde



Tradition: focus on football

- Tweet was a mistake

Tradition: focus on football



The JIVE director

@directtheJIVE

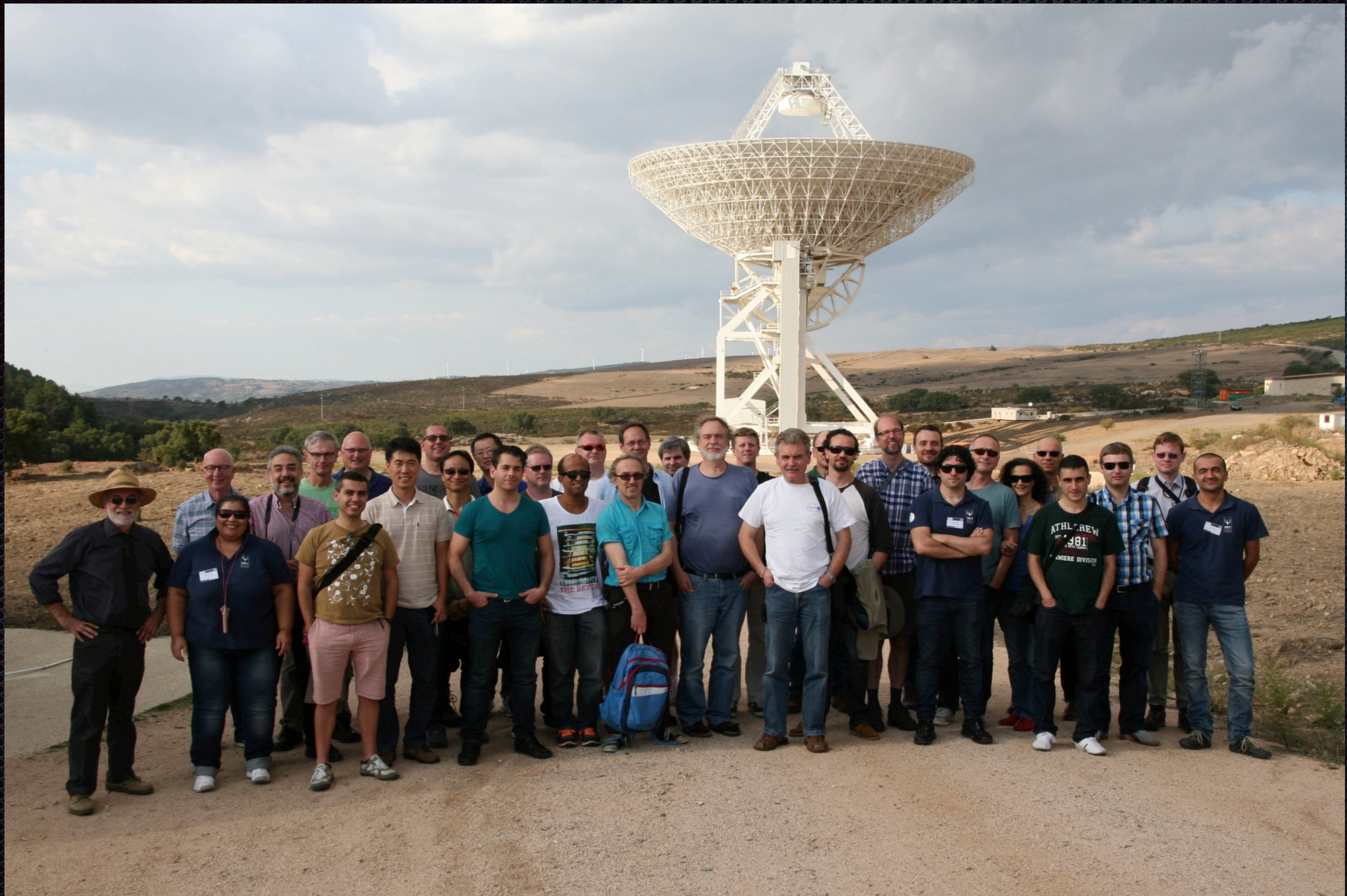
Found my football shoes, ready to go to Cagliari for the EVN symposium [#12evn](#) or [#evn14](#) (what's the tag?)

↩ Reply ★ Favorite ⋮ More

2:01 AM - 6 Oct 2014



Reply to [@directtheJIVE](#)



VLBI Science

- ✦ Fantastic to measure physics
 - ✦ Sizes
 - ✦ Precise positions
 - ✦ Brightness Temperatures
 - ✦ Polarizations
 - ✦ Even motions...

And make pictures!

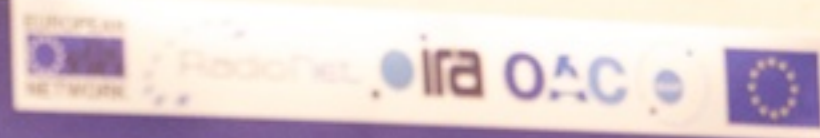
- ✦ Pictures stick in the human brain
 - ✦ Much needed for selling our science
- ✦ Focus on the pictures that stuck with me
 - ✦ Very personal, no judgement to be inferred
 - ✦ Apologies to my collaborators, seen most of their work already



WIFI Connection in the Conference Room

Name of the WIFI: HRM-WIFI
Password: myfreeweb





12th
**EUROPEAN VLBI NETWORK
SYMPOSIUM**

& Users Meeting



THANK YOU - GRAZIE!



New frontiers

- Multi-messenger astronomy
- Transients
- Strive for higher resolution and precision
 - Millimetre VLBI
 - Space VLBI
- Astrometry in the GAIA era
- Synergies with mm and sub-mm VLBI
 - Complementary observations beyond 3.5mm including phased ALMA

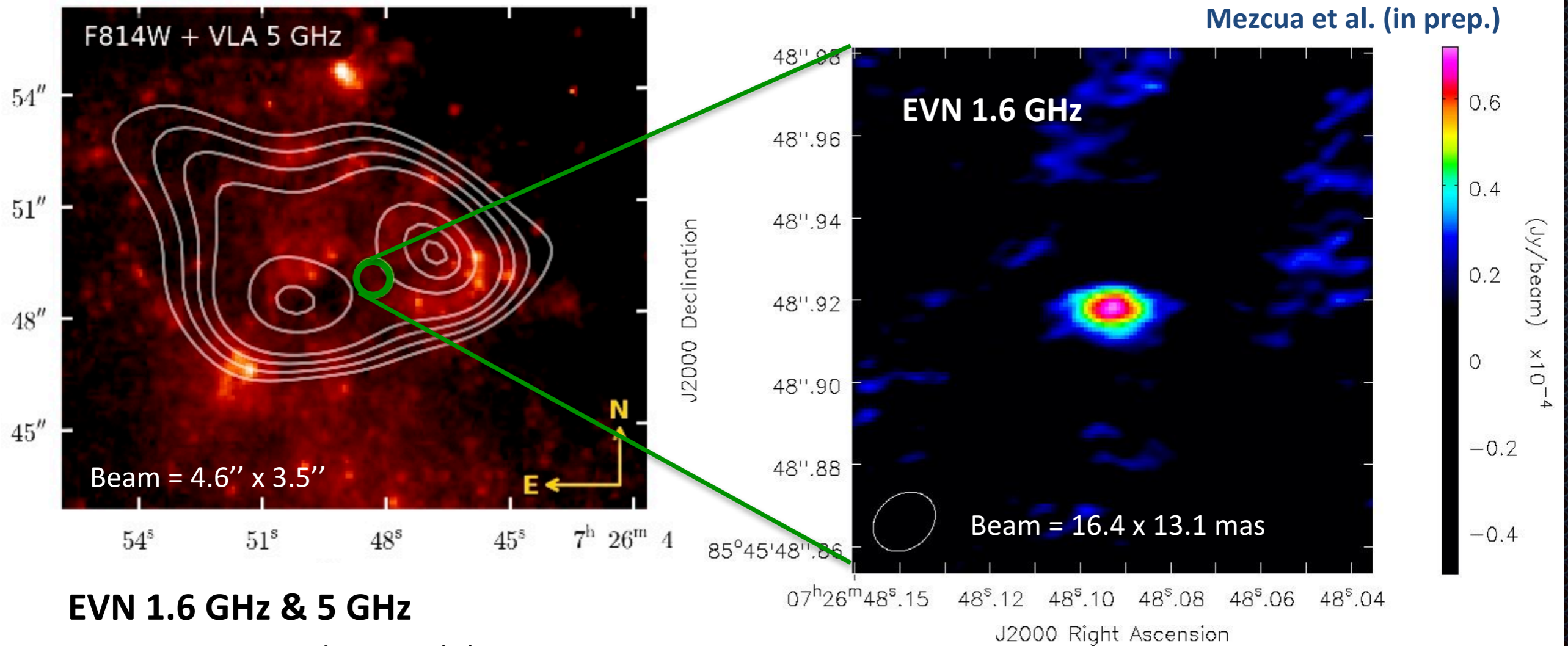


Revealing jet radi
intermediate-ma

Mar Mezcua

Instituto de Astrofísica d

G. Fabbiano, S.A. Farrell, J.C. Glad
T.P. Roberts, D.M. Russell, R. Ser

Quasi-simultaneous EVN+*Chandra* observations**EVN 1.6 GHz & 5 GHz**

1.8 pc jet oriented as VLA lobes

$$\nu L_{1.6\text{GHz}} = 1.4 \times 10^{35} \text{ erg/s}$$

Flat spectral index $\alpha = -0.5 \pm 0.2$

Chandra

Hard spectrum $\Gamma = 1.4 \pm 0.3$

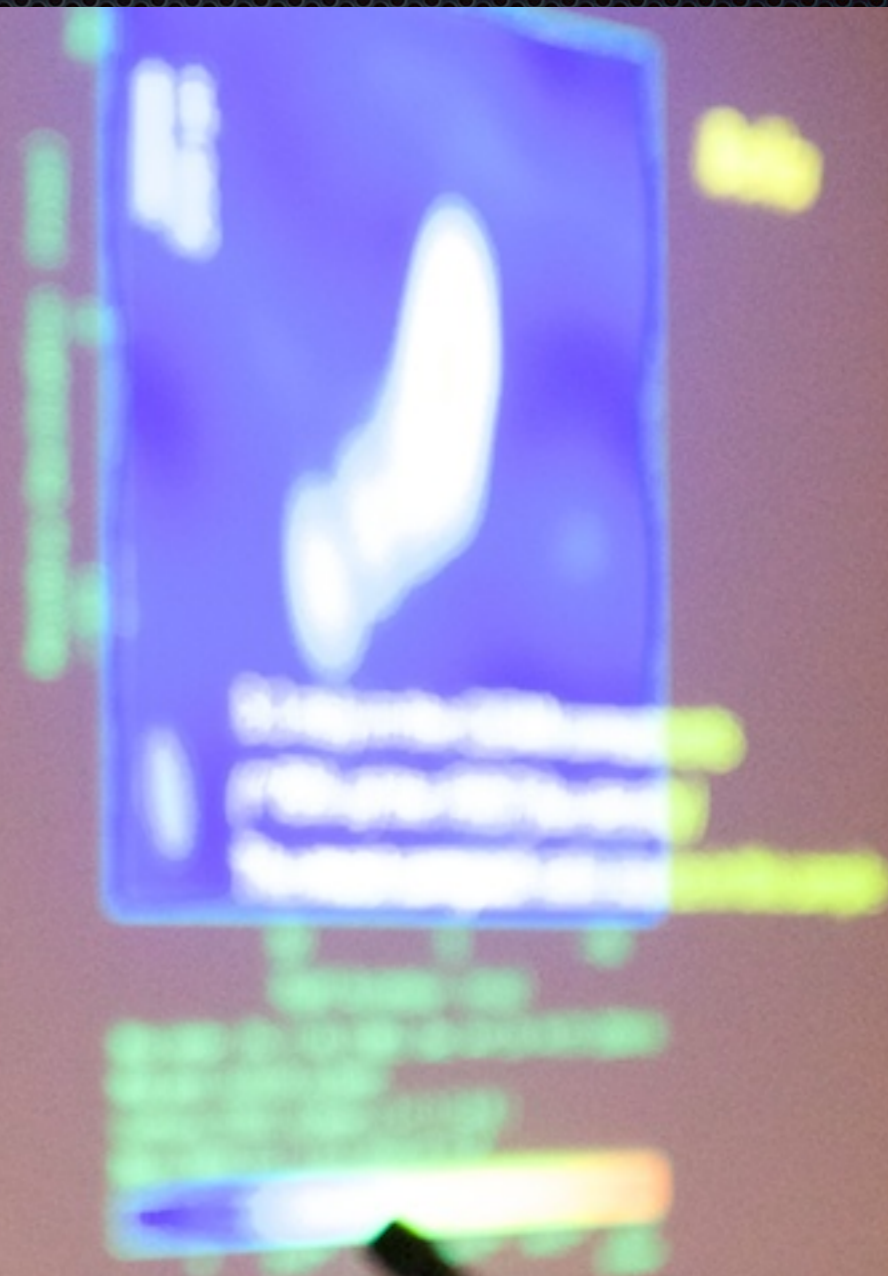
$$L_x = 1.6 \times 10^{40} \text{ erg/s}$$

Fundamental plane

$$M_{\text{BH}} \sim 3.9 \cdot 10^5 M_{\odot}$$

Off-nuclear IMBH

Nucleus of minor merger



EVN SYMPOSIUM 2014
12th European VLBI Network Symposium & Users Meeting
7-10 October 2014, Capri, Italy

On the origin of radio AGN and their co

Franco

THANKS to: Lorenza Bassani, An
Marcello Giroletti, Elisabetta Haver





12th
EUROPEAN VLBI NETWORK
SYMPOSIUM
& Users Meeting

7-10 October 2014
Cagliari, ITALY

Logos for sponsors: European Union, RadioNet, ira, OAC, and the European Union flag.

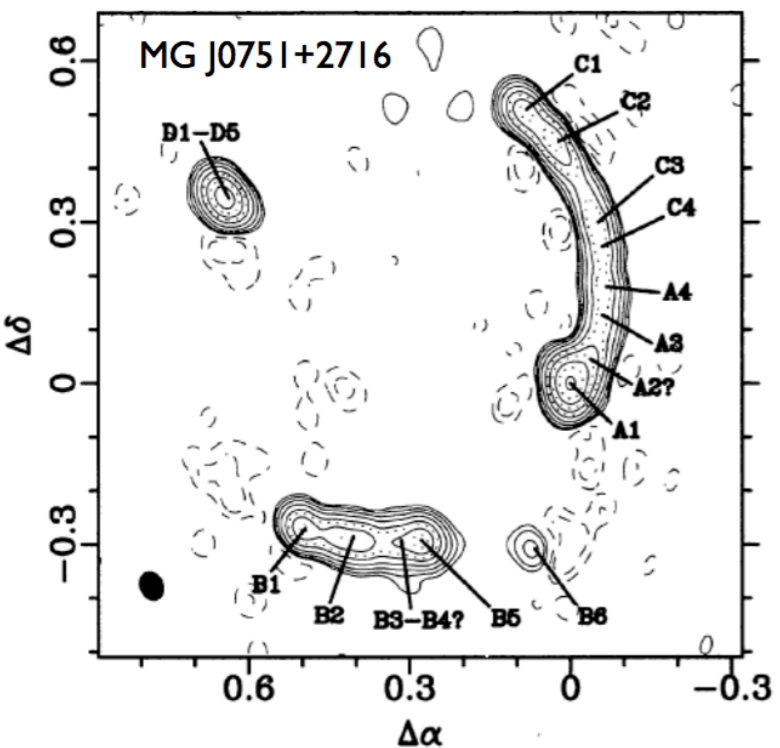
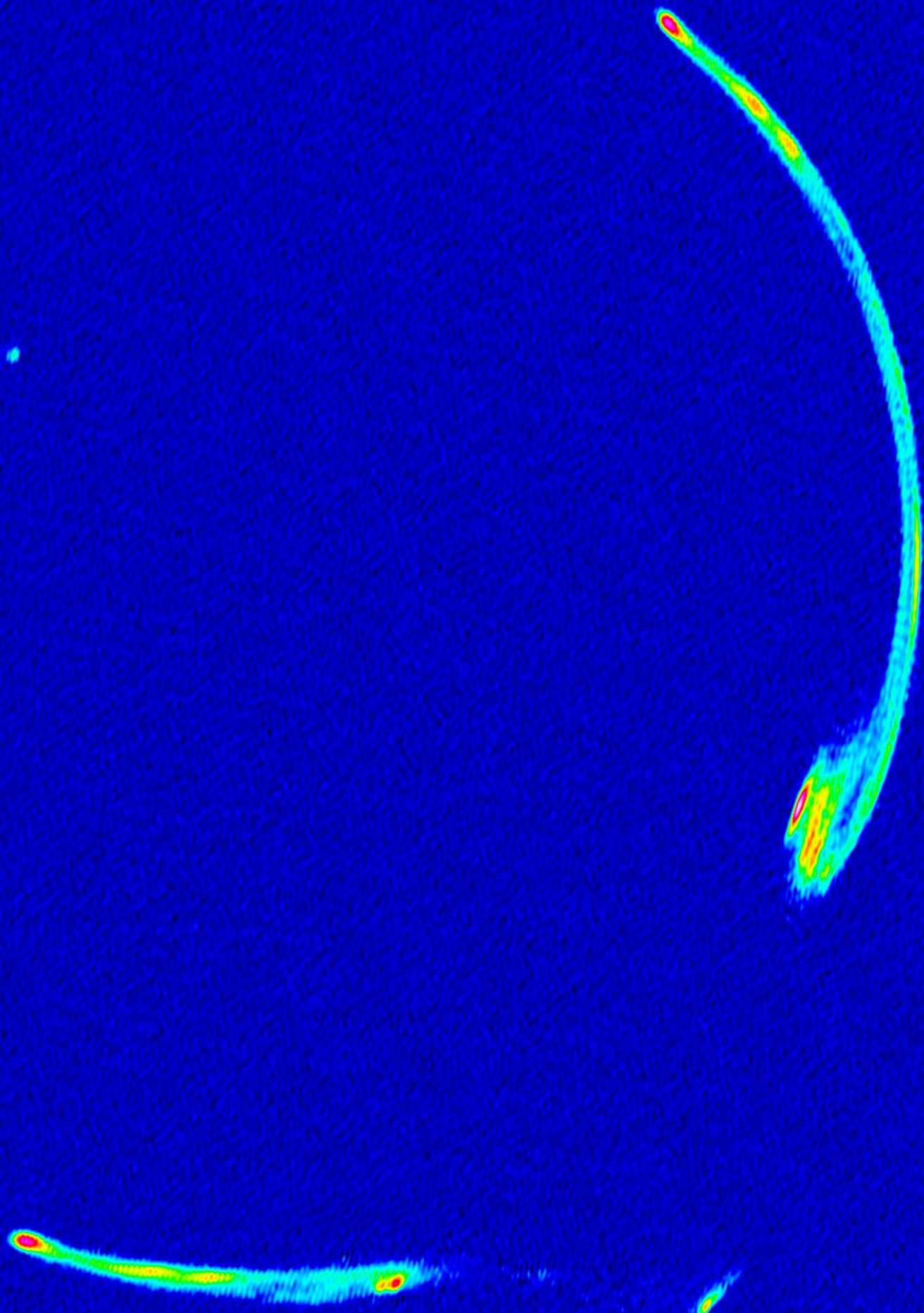
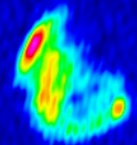
Gravitational lensing angular resolution

John McKean
(SHARP) Matus Rybak, Cristóbal
Matt Auger, Chris Fassnacht,
(mJIVE-20) Adam Deller, M...

MG J0751+2761 ($z = 2.056$)

Beam size 7×2 mas

10 μ Jy / beam rms



(McKean et al., in prep)



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NGC660

Credit: Gemini Observatory / AURA

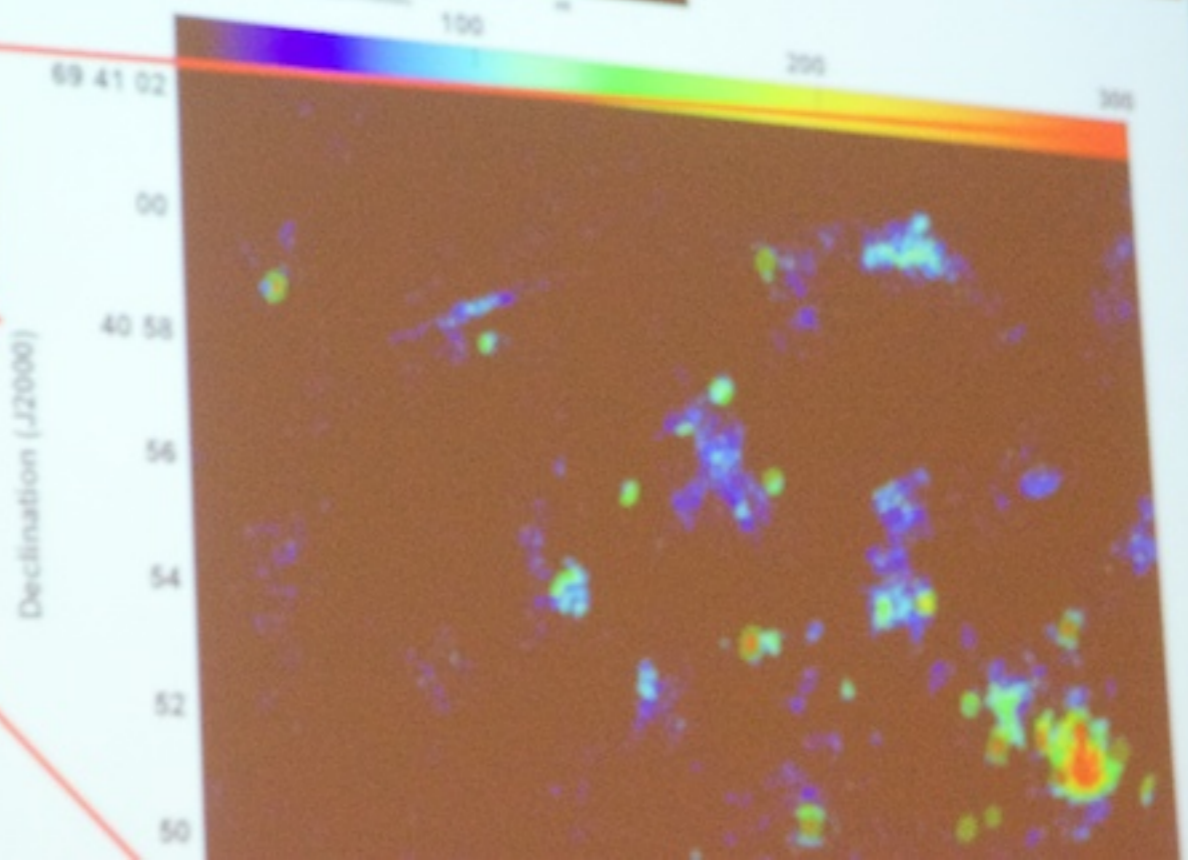
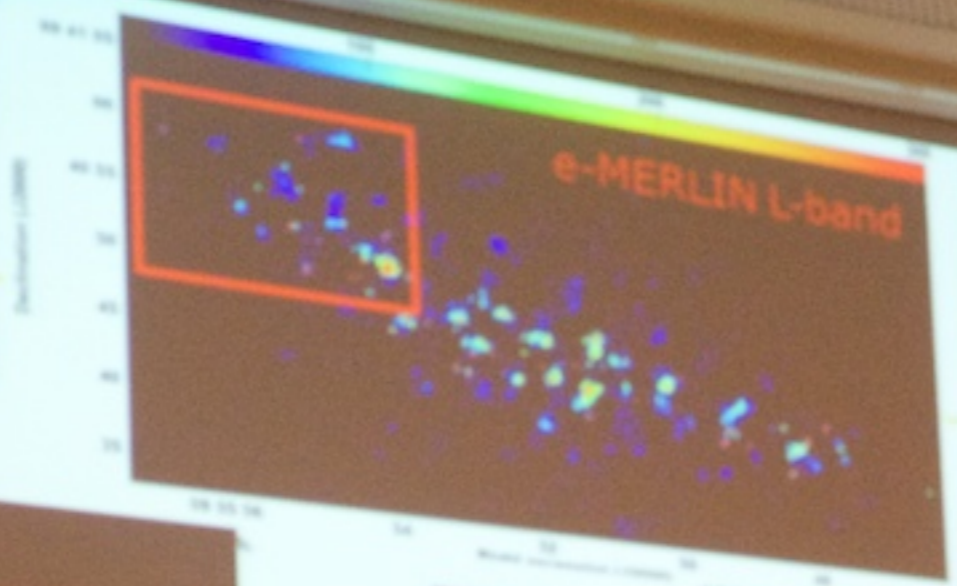


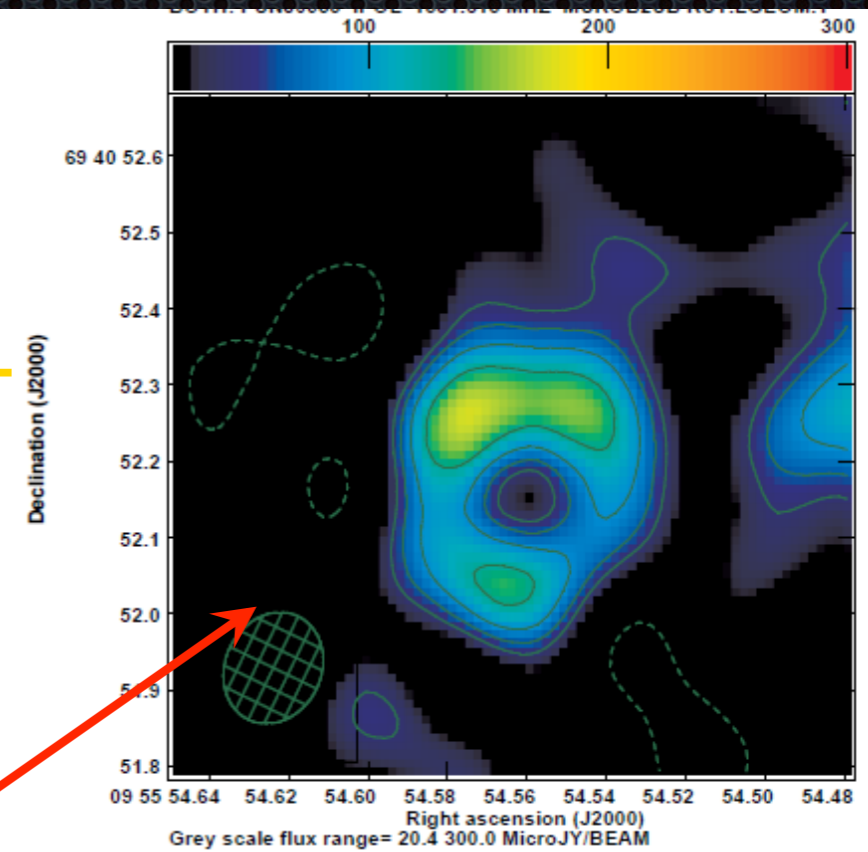
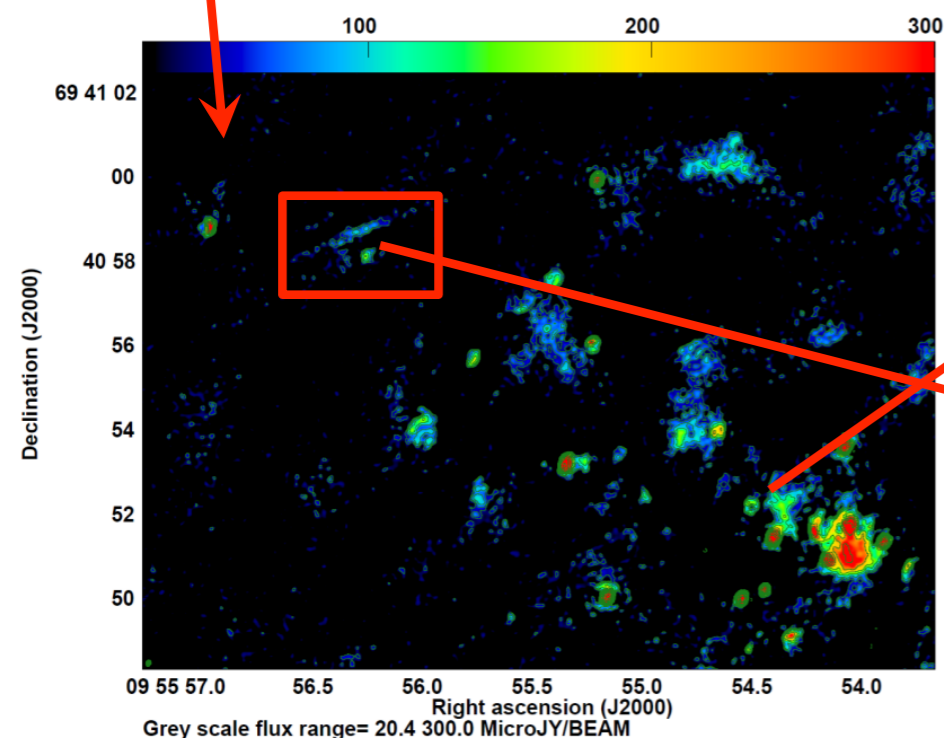
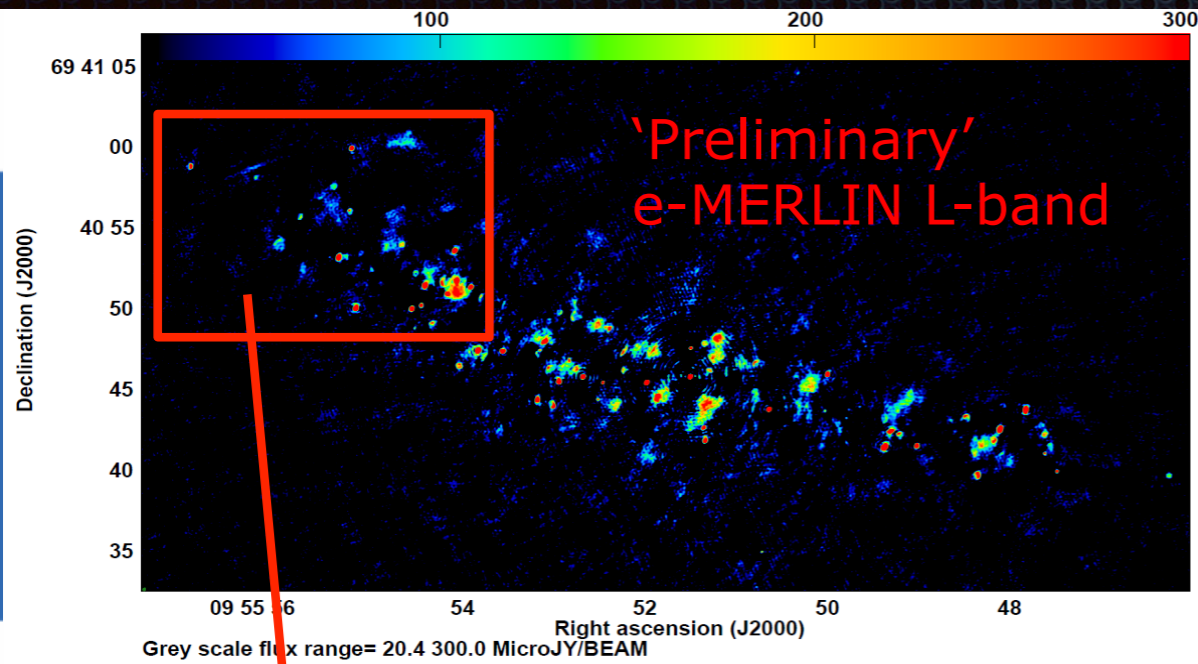




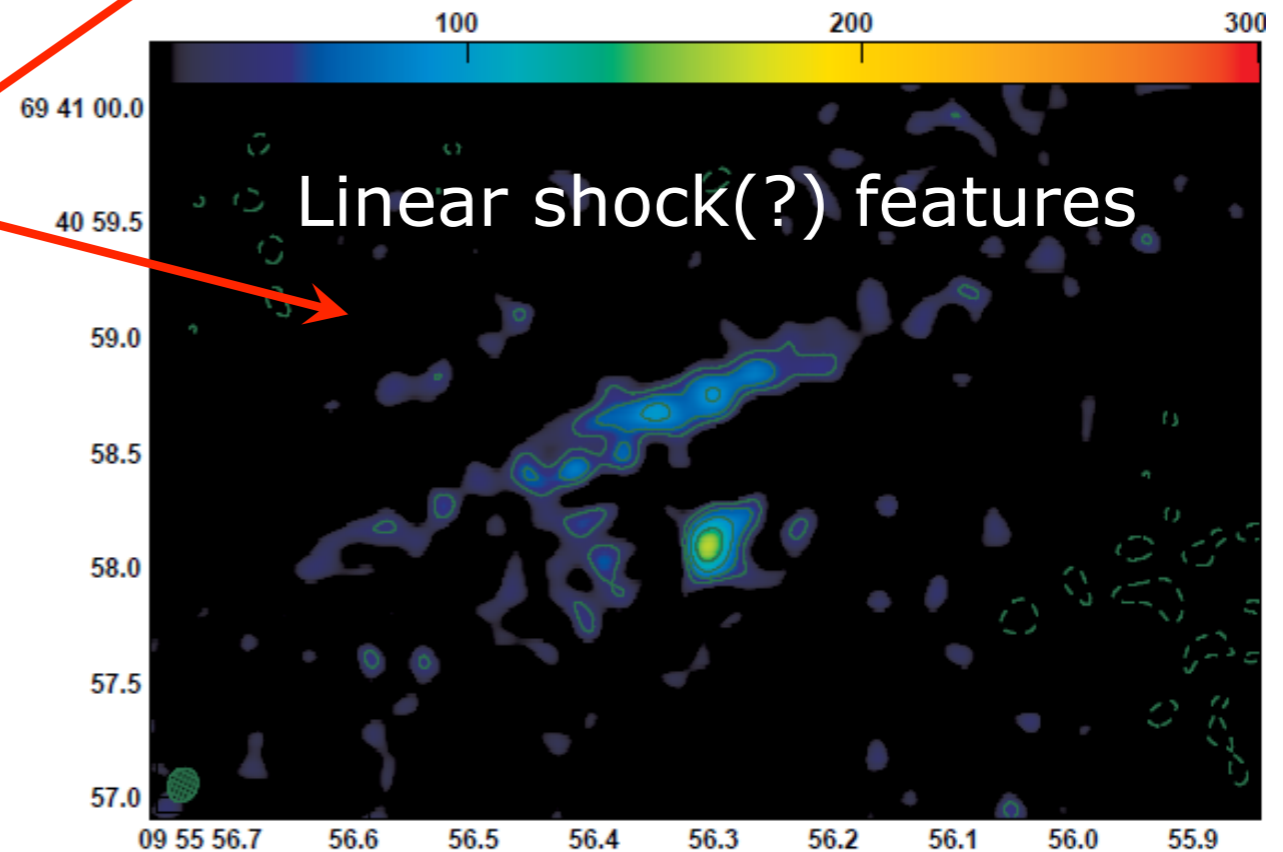
THANK YOU!







Multiple New faint 'old' RSNe



1.25-1.7GHz
rms ~ 16 μ Jy/bm (imaging limited
by ill-constrained extended flux)
150mas resolution




A single L-B
pointing on a
lensing cluster
A2218 ($z=0.1$)

Best-fit mass $1.4 \times 10^{14} M_{\odot}$

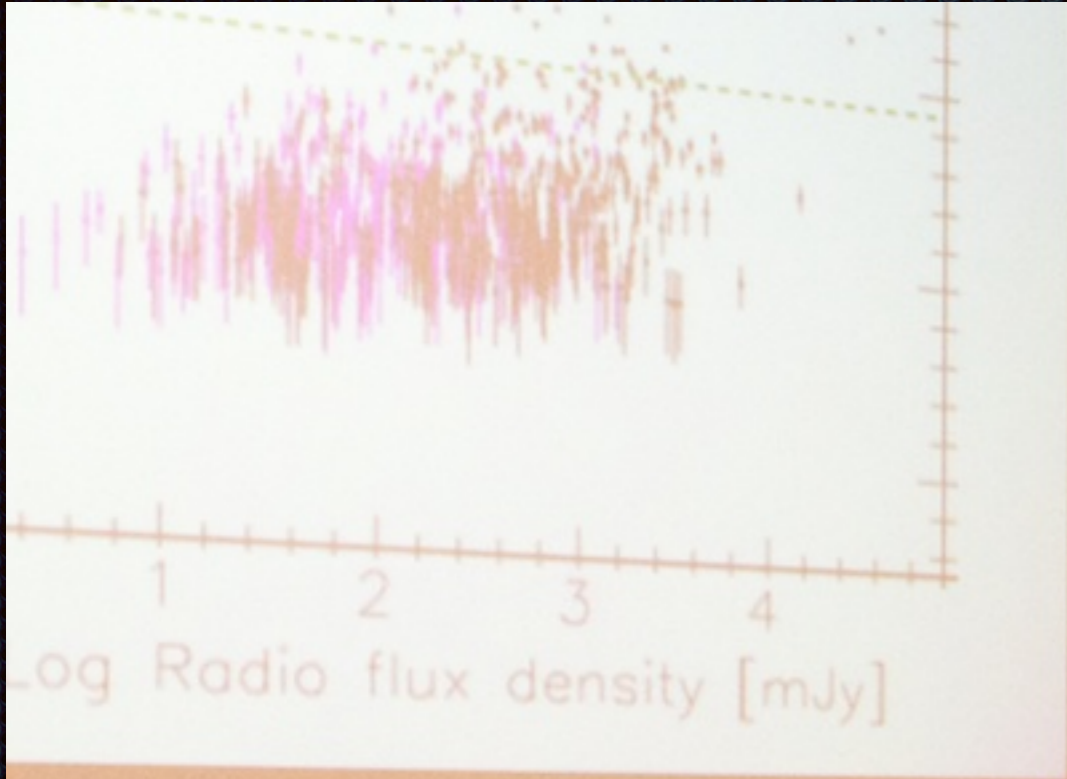
e-MER

→









RadioNet

Transitional Access

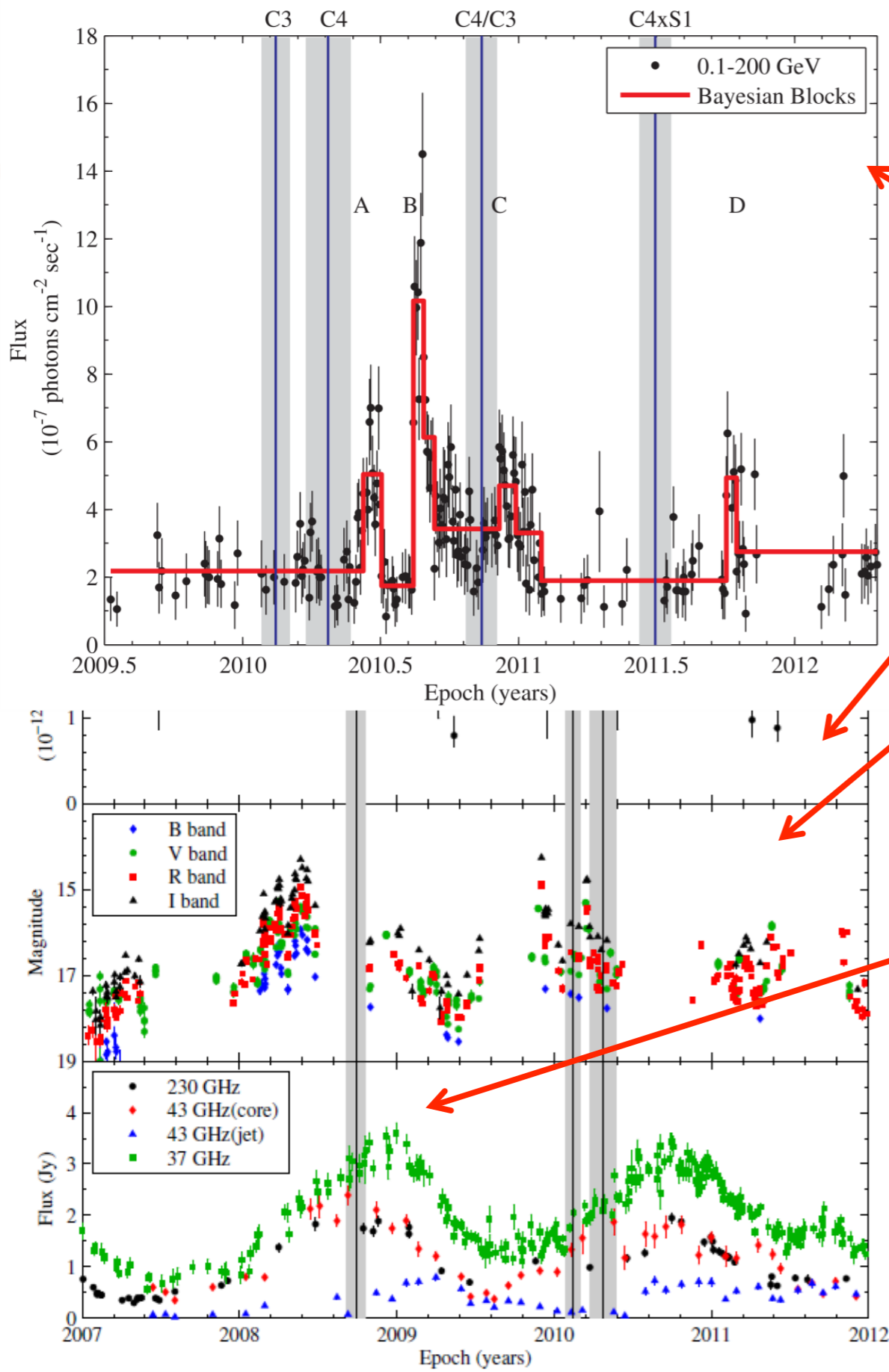
www.RadioNet.eu





Multifrequency light curves from 2007-2012

- Fermi/LAT 0.1-200 GeV
- Multiple flaring states in γ rays
- Flare and sub-flares have different
- ~~Saripal XRT 0.3-10 keV (8-20 days)~~
- Under-sampled X-ray data
- ~~Mei Shangguan, Galax and MIAA~~ ~~Crimea & St. Petersburg State Univ.~~ (230 GHz) along with 43 GHz VLBA
- Gaps in optical due to solar conjunction
- Exponential rise/decay in mm-waveband
- Orphan mm-flare?

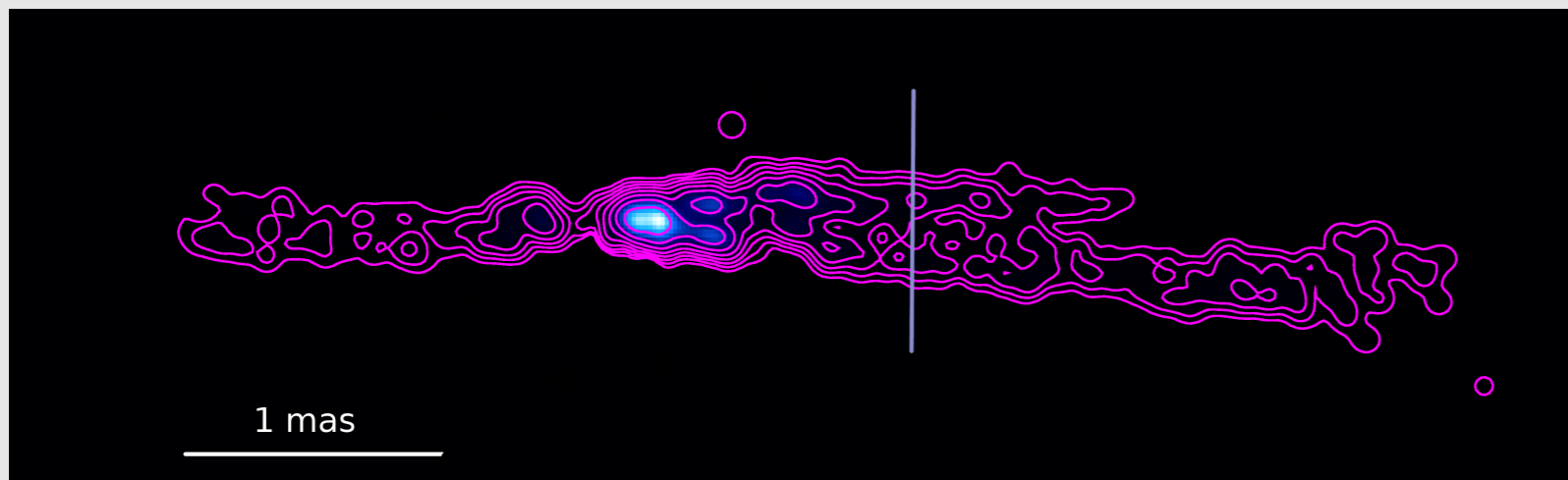




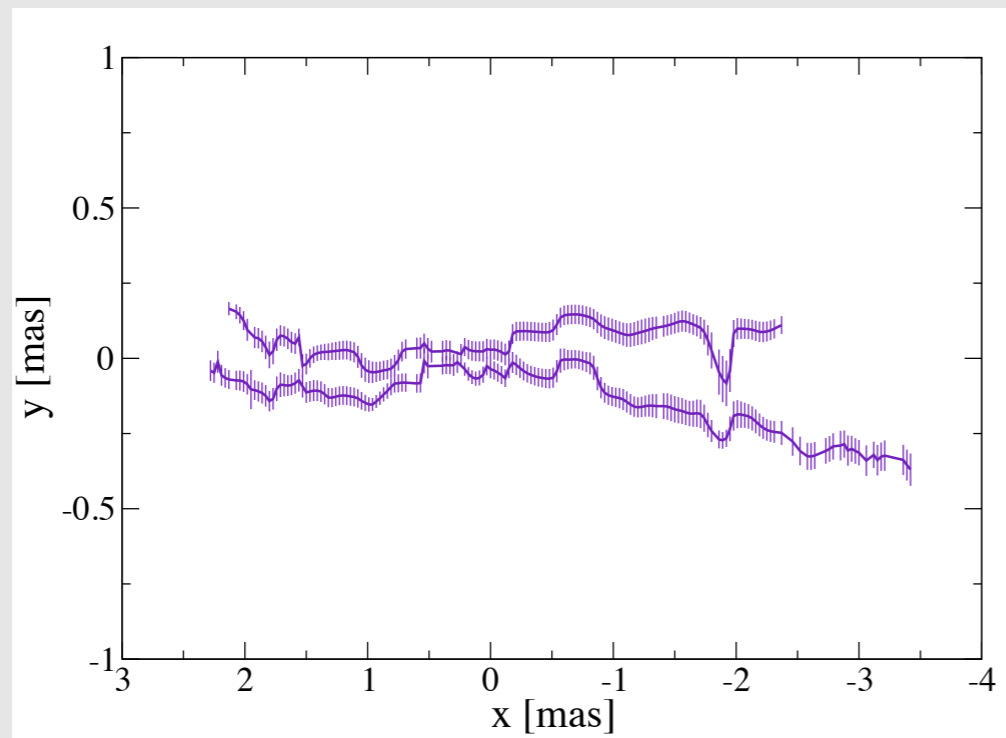
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RIDGE LINE STUDY AT 7 MM

7 mm map from November 2009, restored with beam FWHM of 0.1 mas



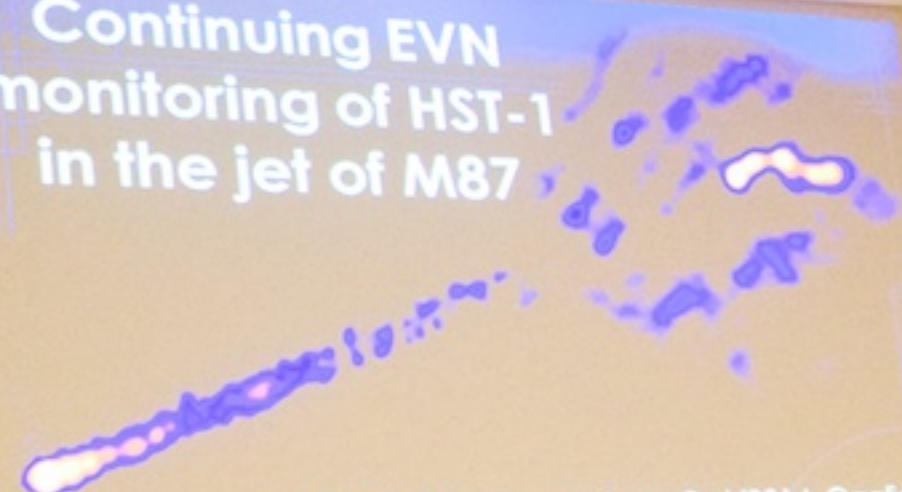
- ▶ Maps restored with circular beam of 0.15 mas FWHM.
- ▶ Sliced transversally pixel by pixel (every 0.03 mas).
- ▶ Gaussian fit of the double peaked intensity profiles.



Double ridge line structure present both in jet and counter-jet!



Continuing EVN monitoring of HST-1 in the jet of M87



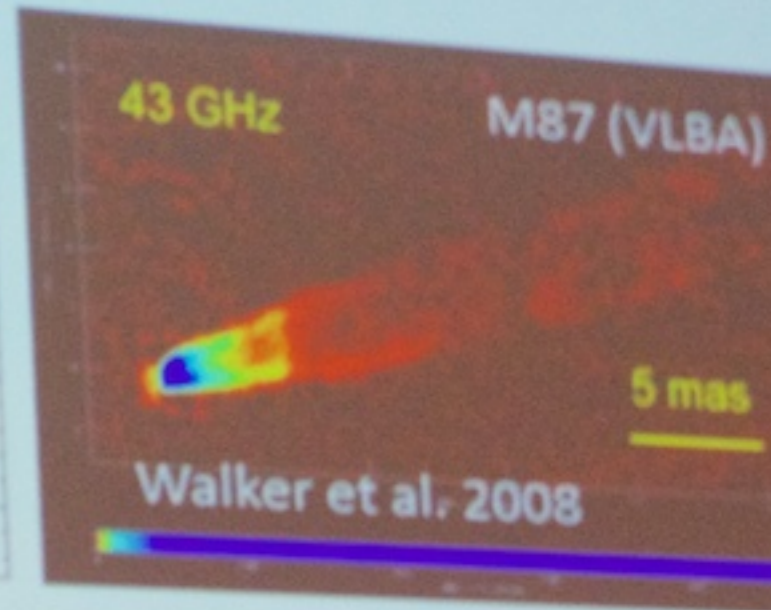
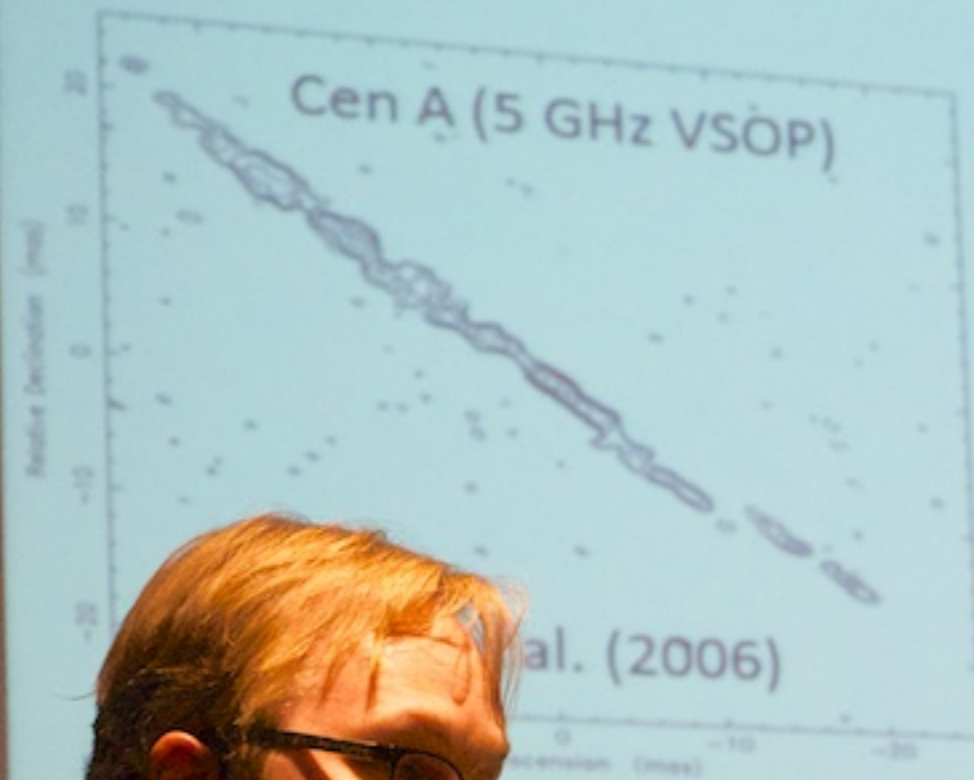
The 12th EVN Symposium, Oct/2014, Cagliari
Kazuhiro Hada (INAF-IRA/NAOJ)

Gioirotti M., Giovannini G., Casadio C., Bellicke M., Cesarini A., Cheung C., Dol A., Krawczynski H., Kino M., Lee N., Nagai H. et al.



12th EUROPEAN VLBI NETWORK SYMPOSIUM & Users Meeting
7-10 October 2014 Cagliari, ITALY

Nearby AGN K



$D = 3.8 \text{ Mpc}$

$0.018 \text{ pc} = 3000 R_S$

$(M_{BH} = 6 \times 10^7 M_{Sol})$

baseline: $500 R_S$ @

22 GHz

$M87 (D=16 \text{ Mpc})$

- $1 \text{ mas} = 0.078 \text{ pc} \sim 140 R_S$

$(M_{BH} = 6 \times 10^9 M_{Sol})$

- $10 D_{Earth}$ baseline: $14 R_S$

$5 \text{ GHz}; 3 R_S @ 22 \text{ GHz}$



EUROPEAN NETWORK RadoNet ira OAC

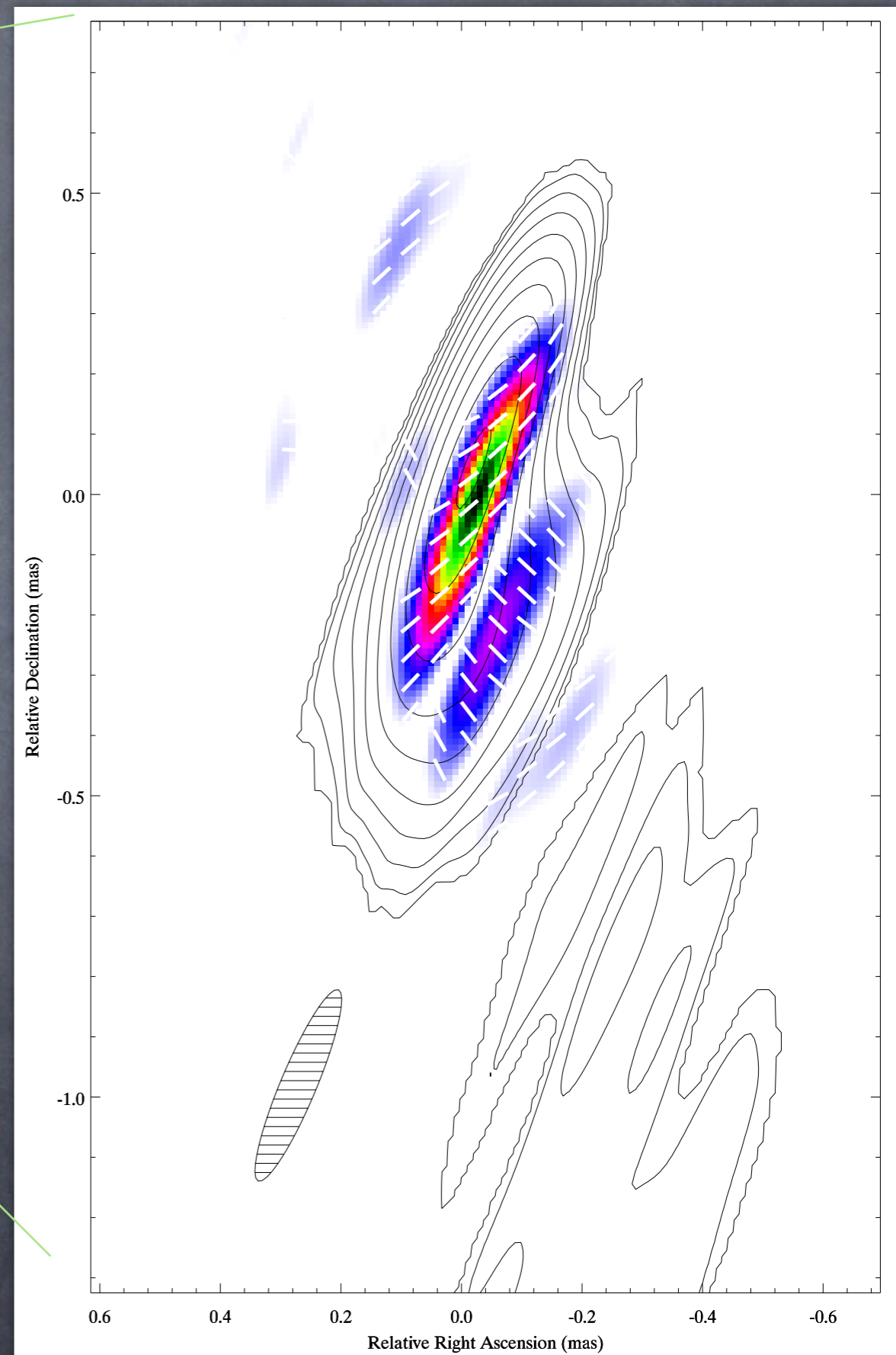
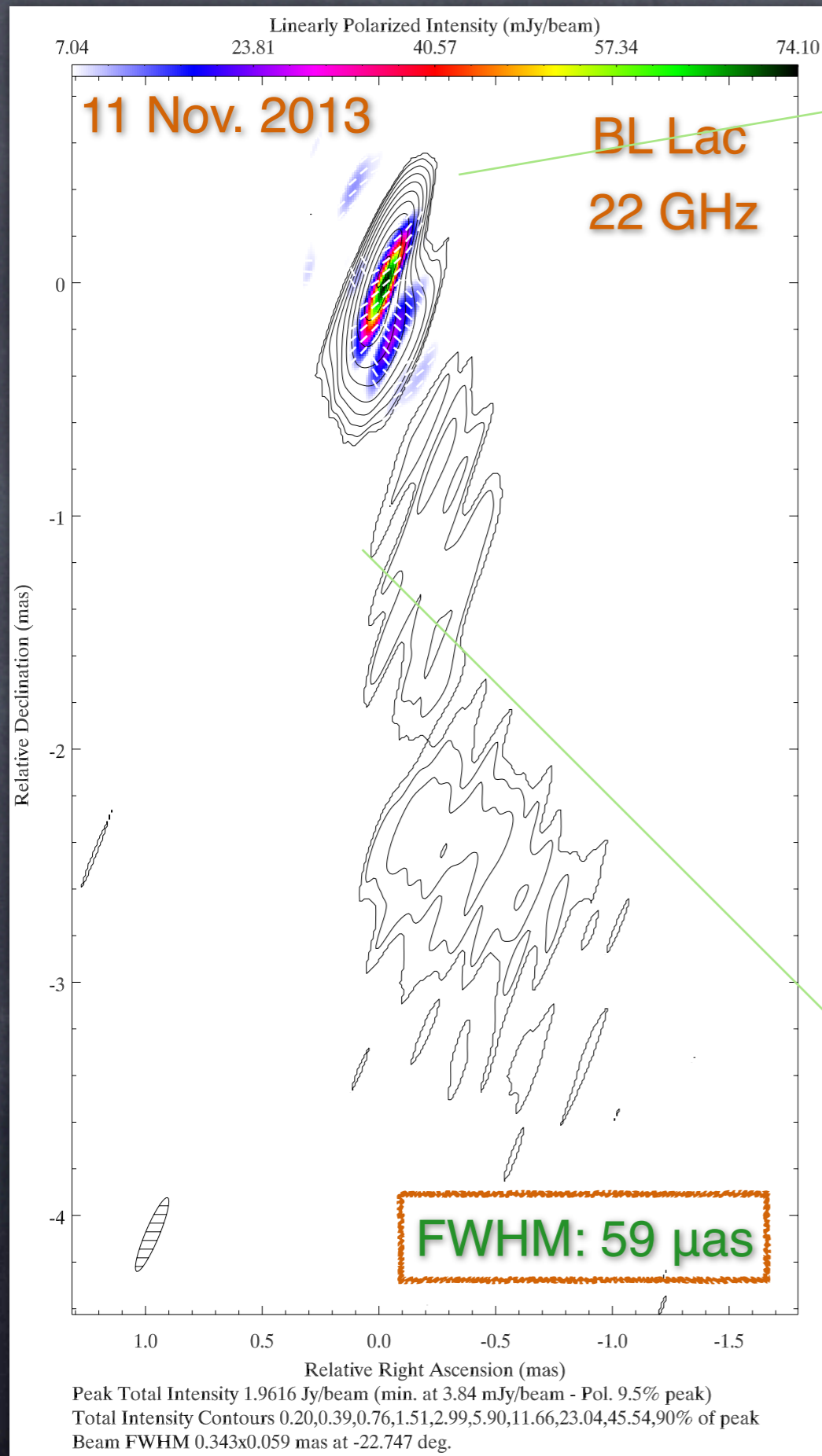
12th EUROPEAN VLBI NETWORK SYMPOSIUM







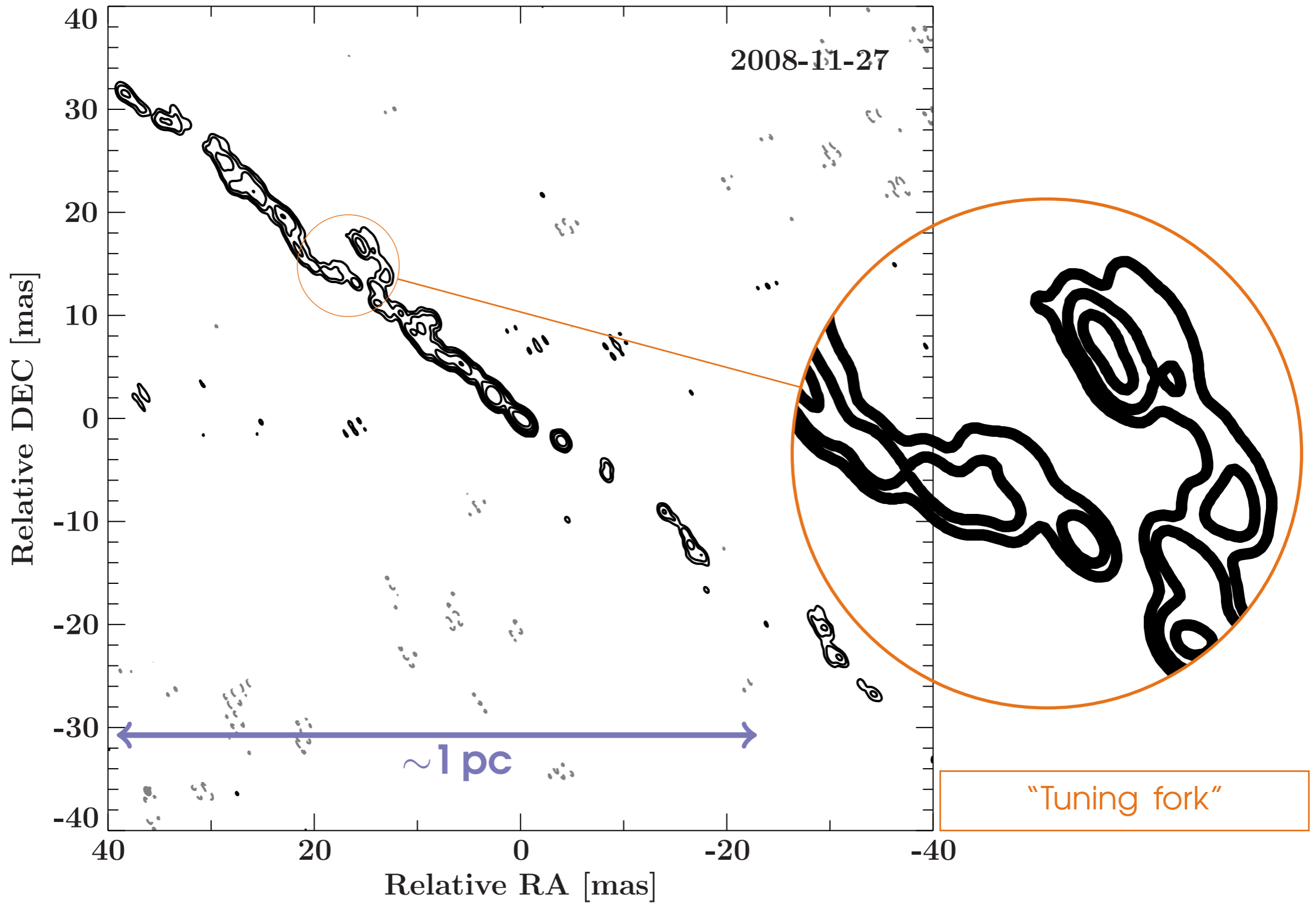
A KSP FOR POLARIMETRIC SPACE-VLBI WITH RADIOASTRON



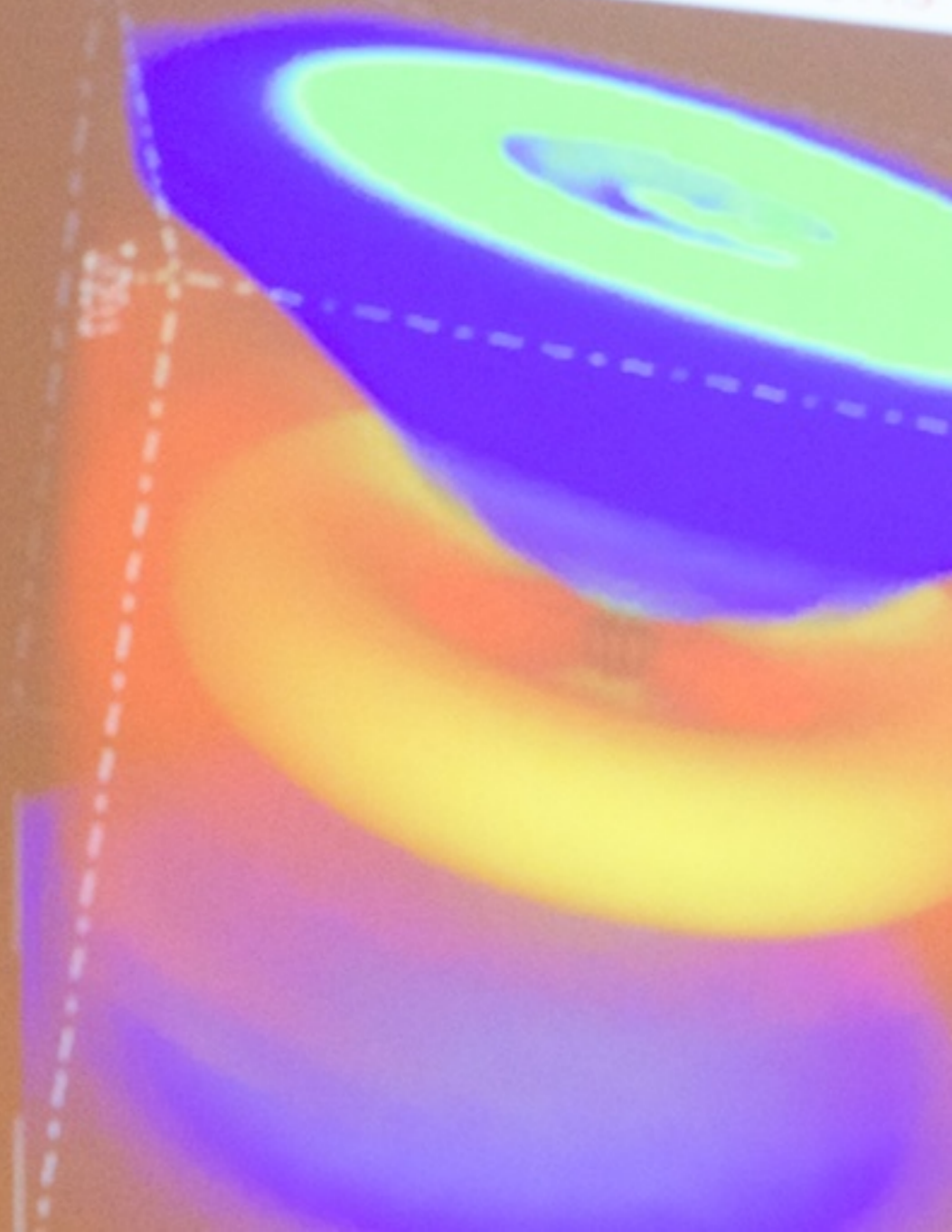




JET STRUCTURE



3D GRMHD Simulations

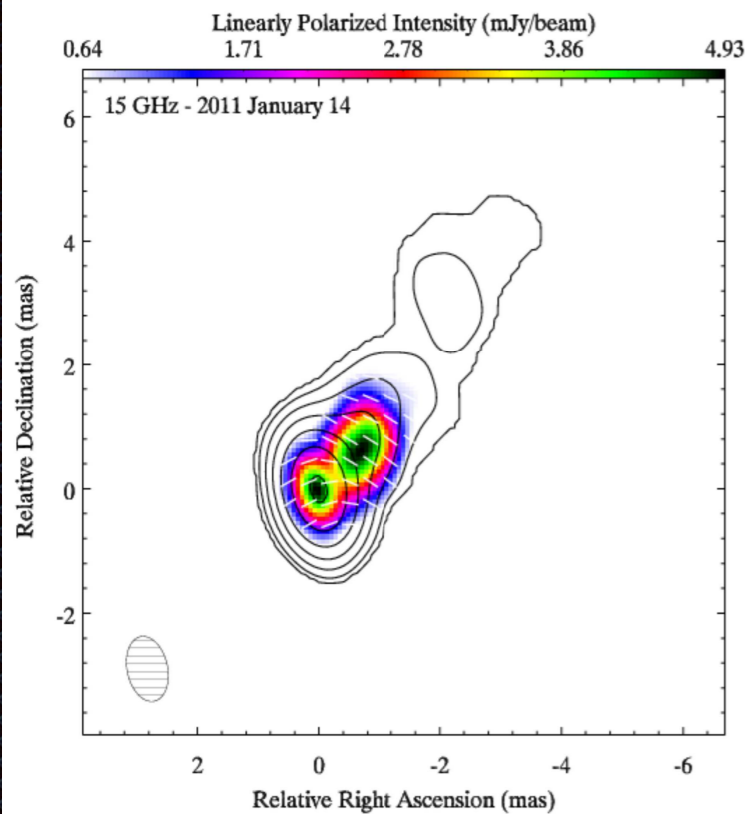




Pietro Lico
Ph.D. Candidate in Management - Bocconi

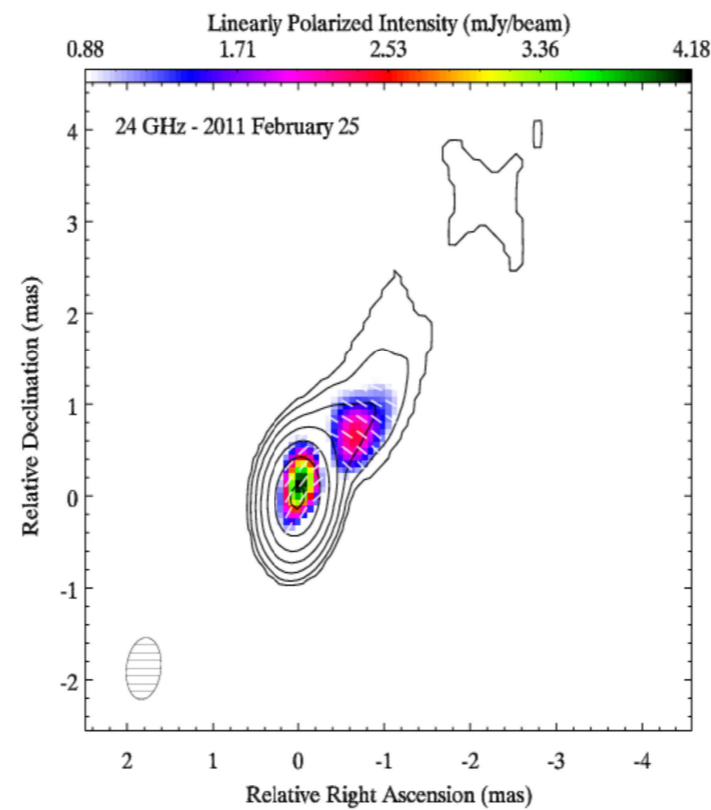


Polarized intensity images



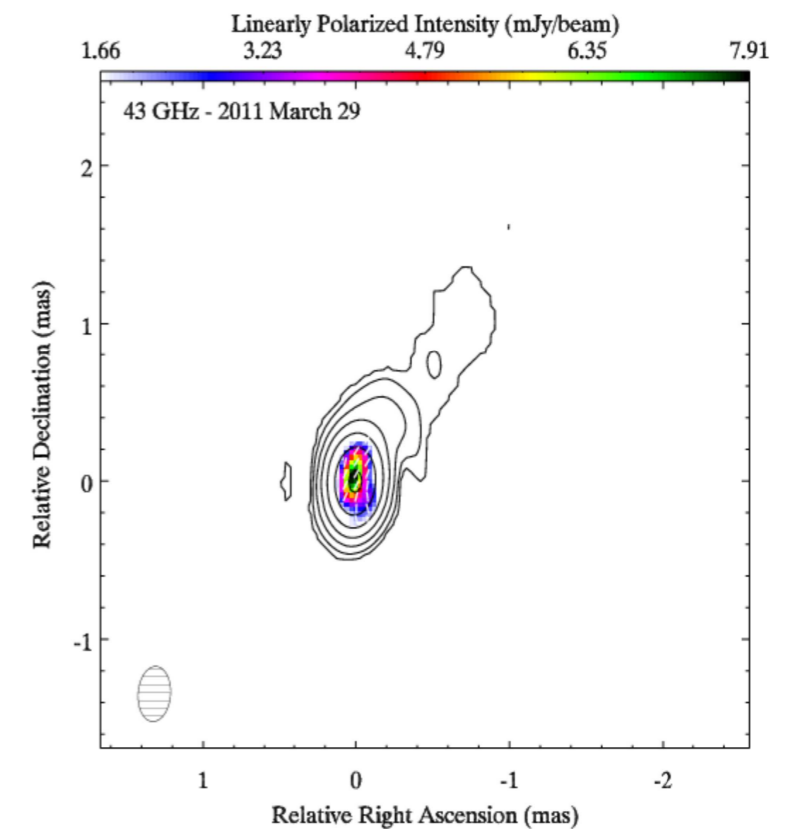
15GHz

Beam: 0.92mas x 0.54mas



24GHz

Beam: 0.58mas x 0.35mas



43GHz

Beam: 0.42mas x 0.27mas

- The polarized emission extends for about 1 mas from the core region at 15 and 24 GHz.
- At 43 GHz we only detect polarized emission within the core region.
- The mean degree of polarization for the core is ~1%, while for the Jet ~15%.
- EVPAs have different behavior with the time, the frequency and the jet location.



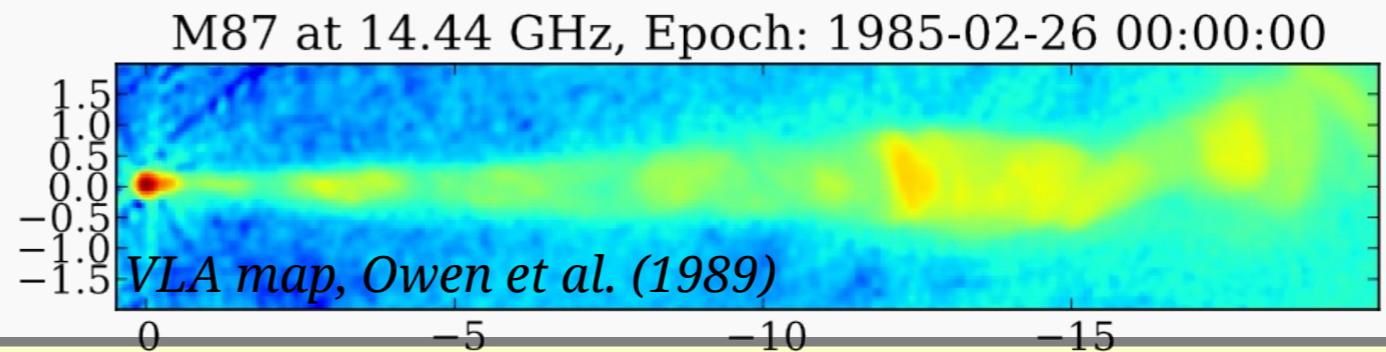
M87



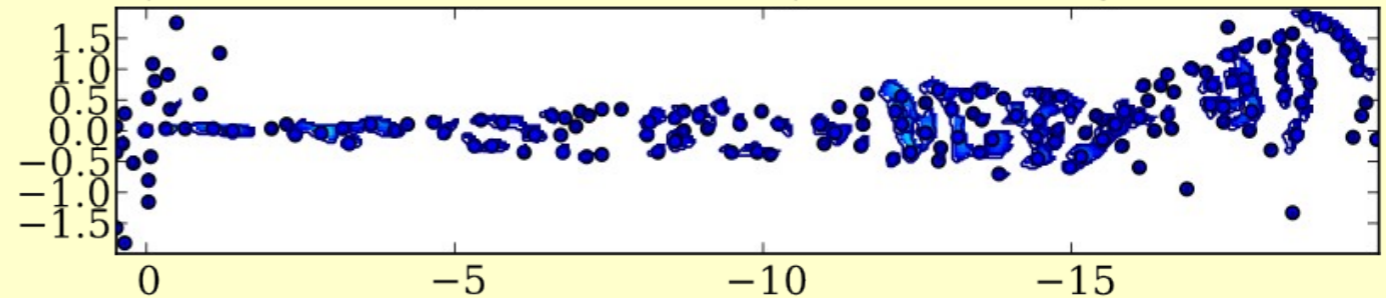
12th EUROPEAN VLBI NETWORK SYMPOSIUM

Wavelet-based Image Segmentation and Evaluation (WISE)

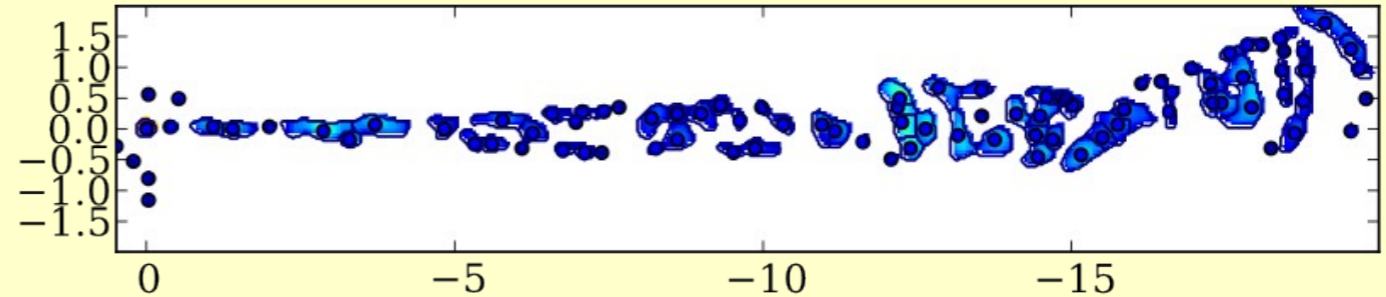
- Structure analysis (Decomposition of an image into Structural significant patterns)
- Velocity analysis (Multiscale cross correlation)



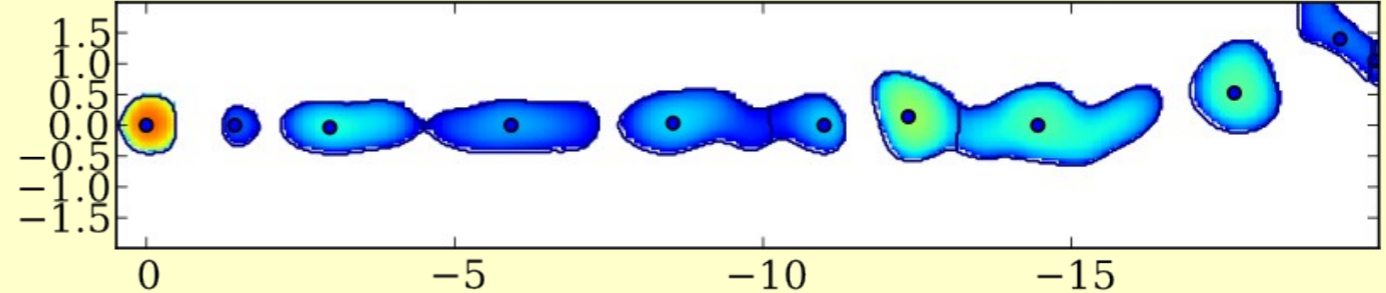
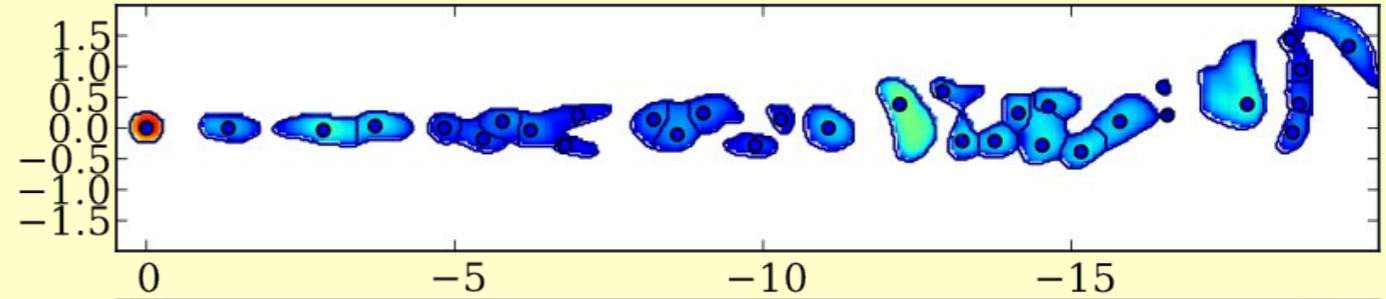
Finest scales:
Detailed description
down to ~ 0.25 FWHM
2D velocity field

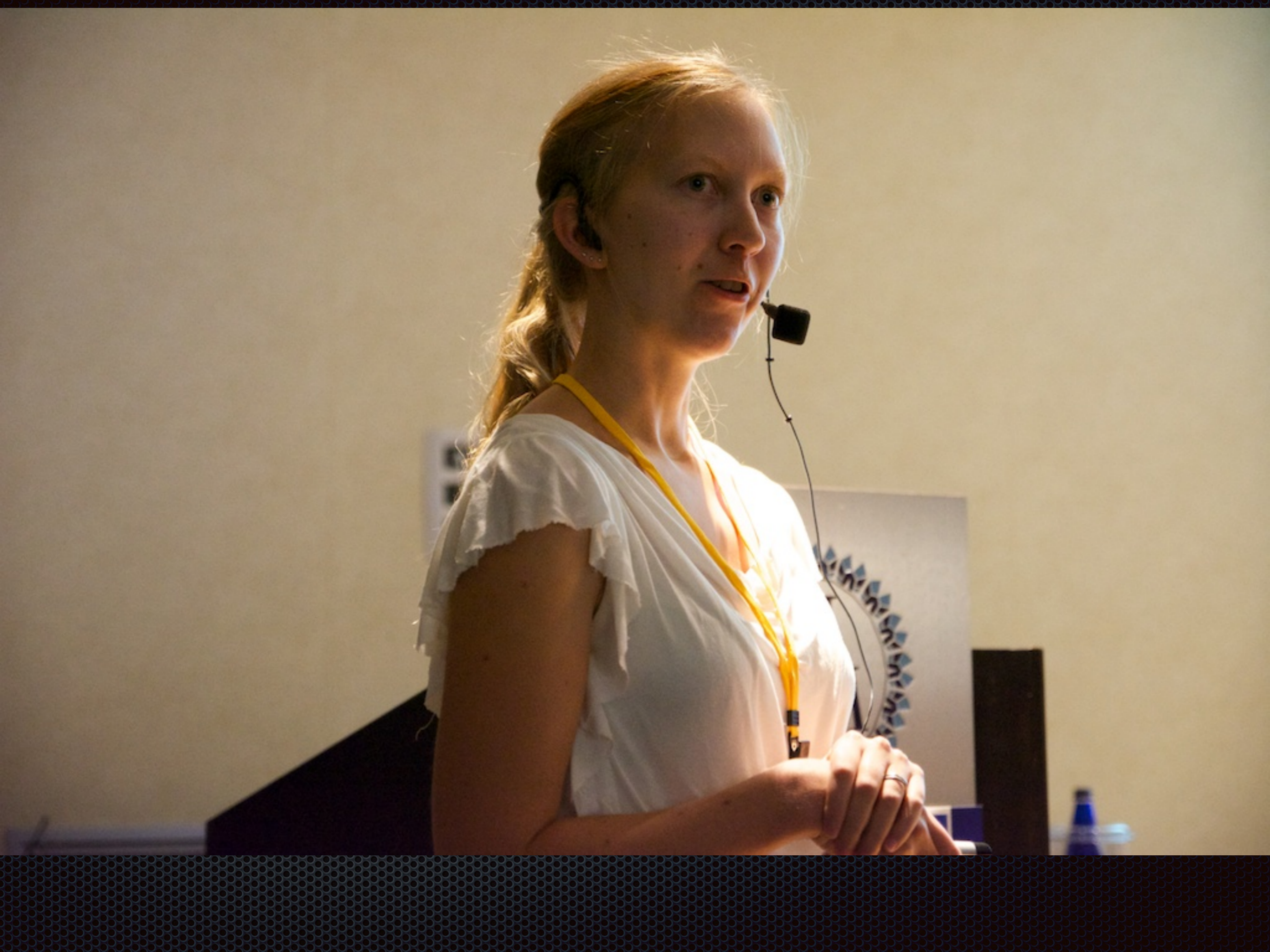


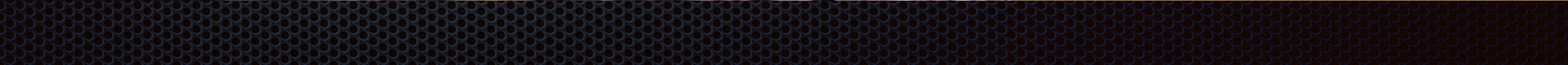
Intermediate scales:
Ridge-line detection



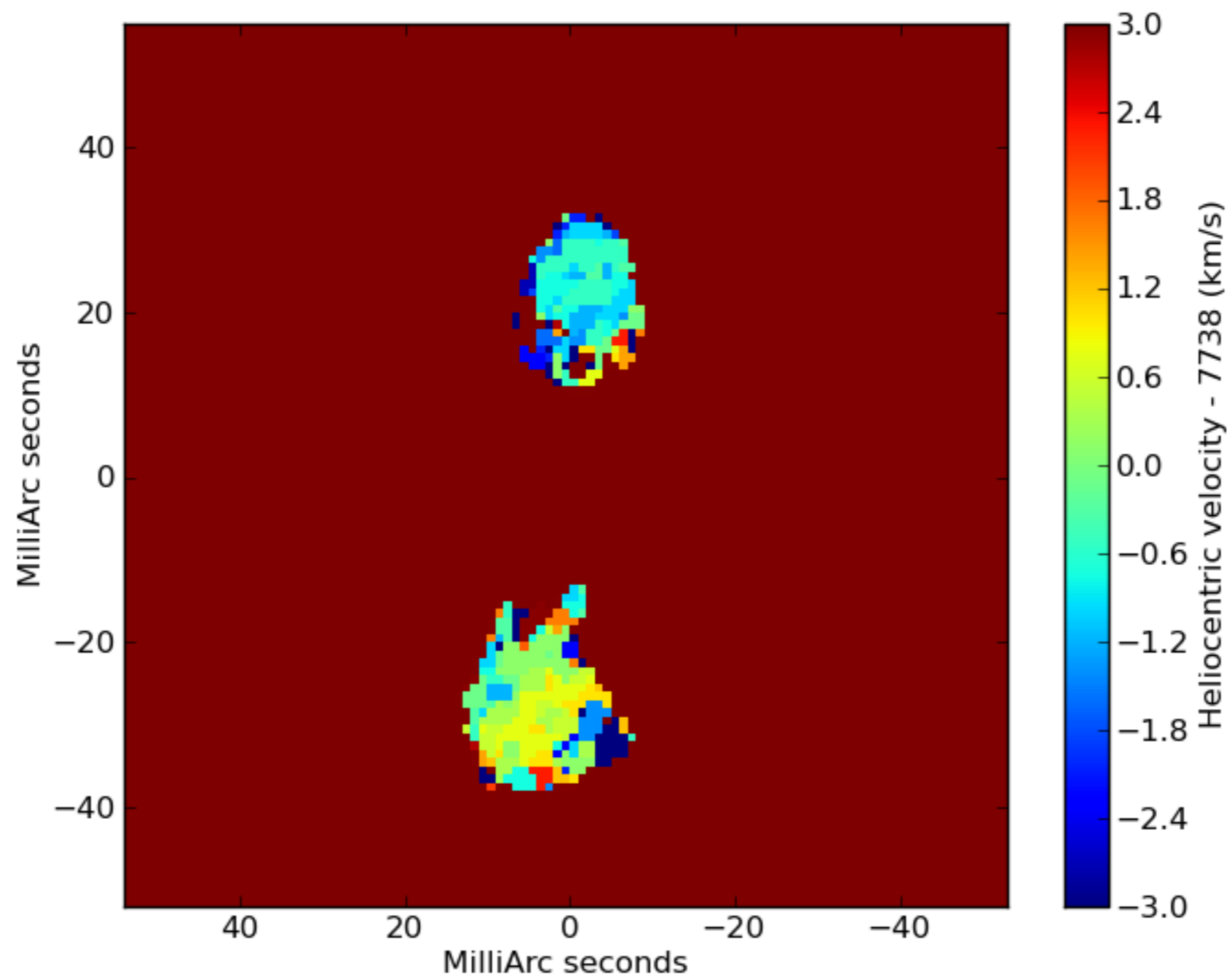
Coarse scales:
Equivalent to model-fit

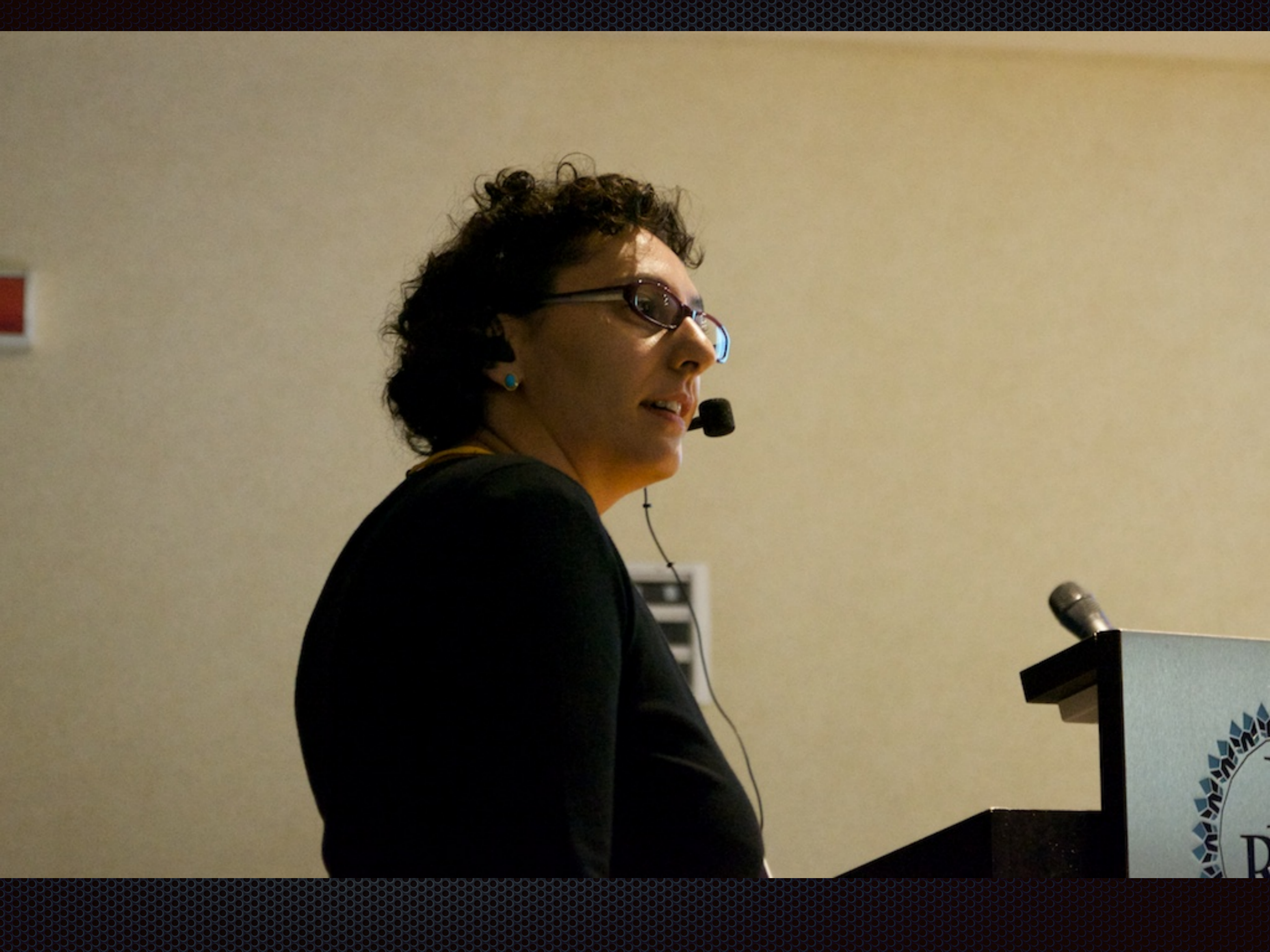
















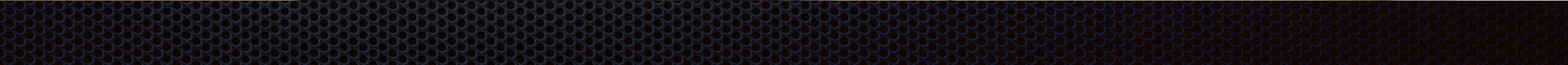
Walter Aiof
Lecturer





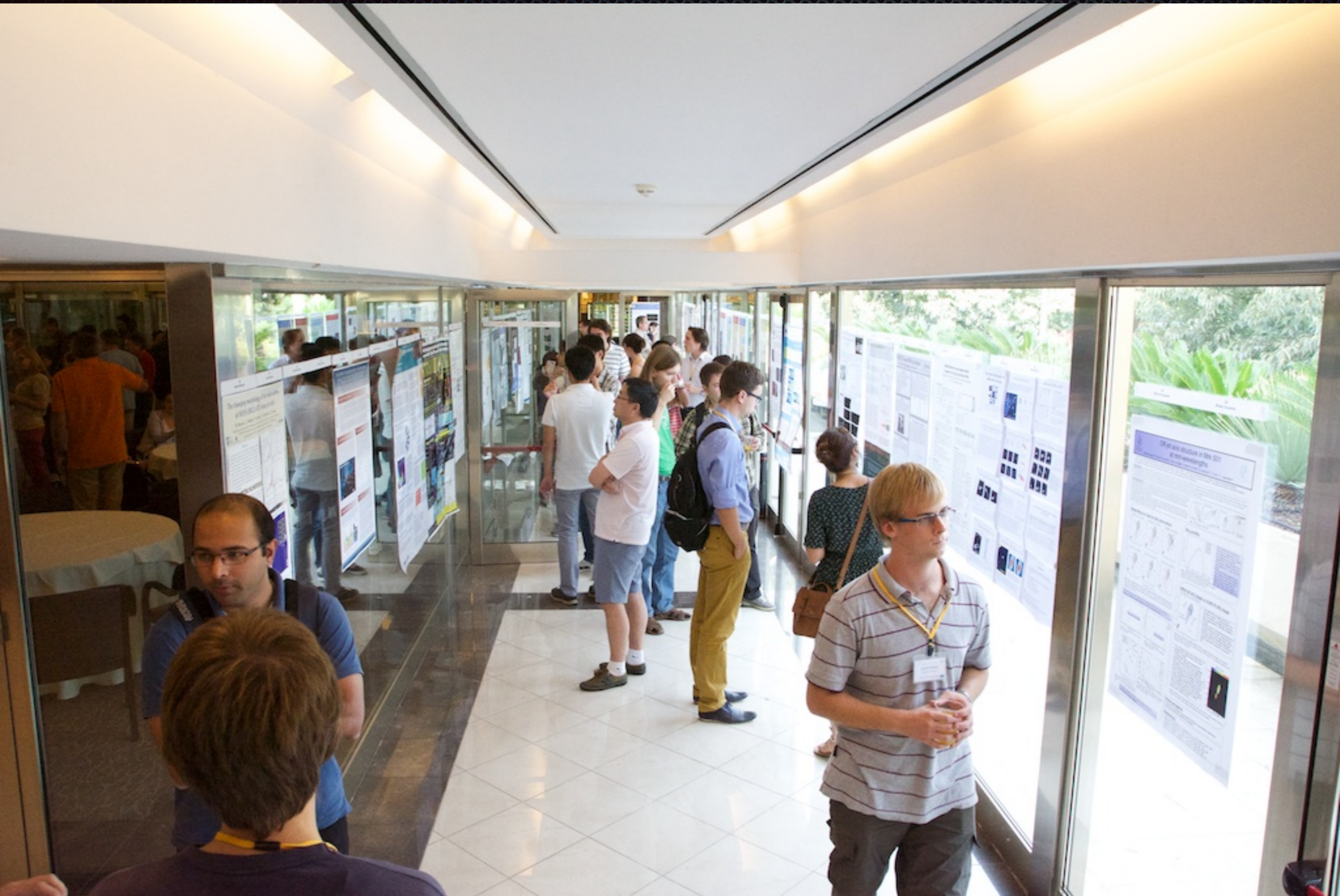
Ivan Martí-Vidal
Director General of Research





Some observations

- ✦ Broad science, both classical and innovative
- ✦ Nice distribution of age and gender
- ✦ Fundamental research addressed by VLBI
- ✦ Enormous data processing effort, quite fast often
- ✦ Some presentations extremely beautiful
- ✦ All very easy to follow, clear structure, clear language



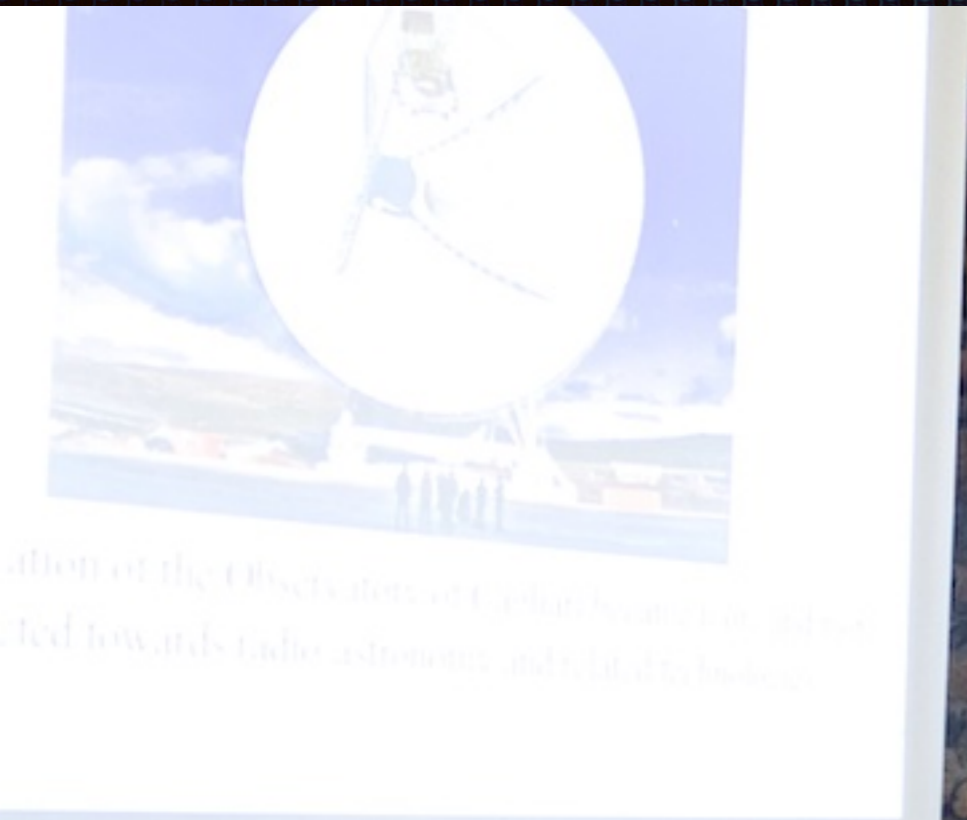
















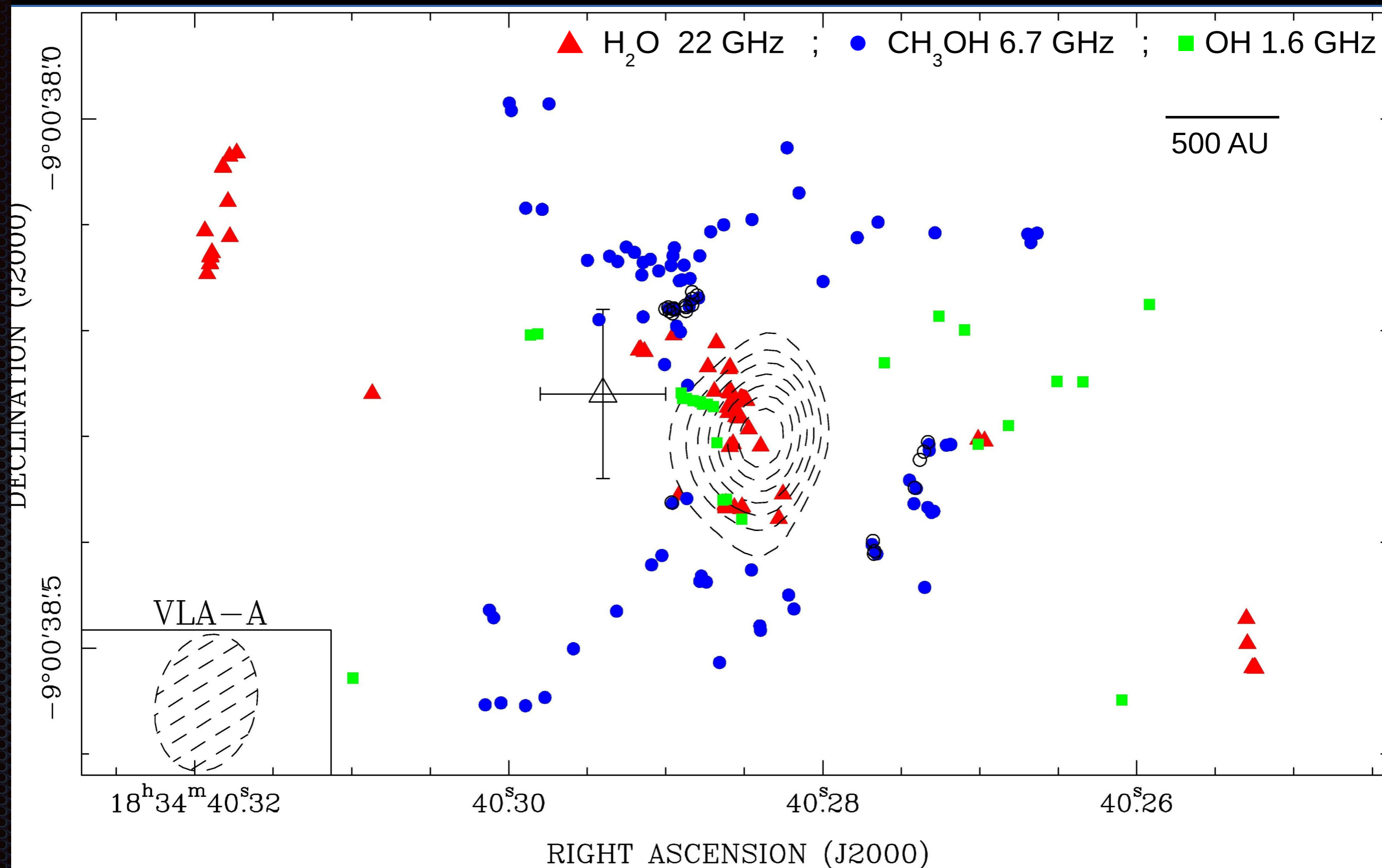








Spatial Distribution of Molecular Masers in G23.01-0.41

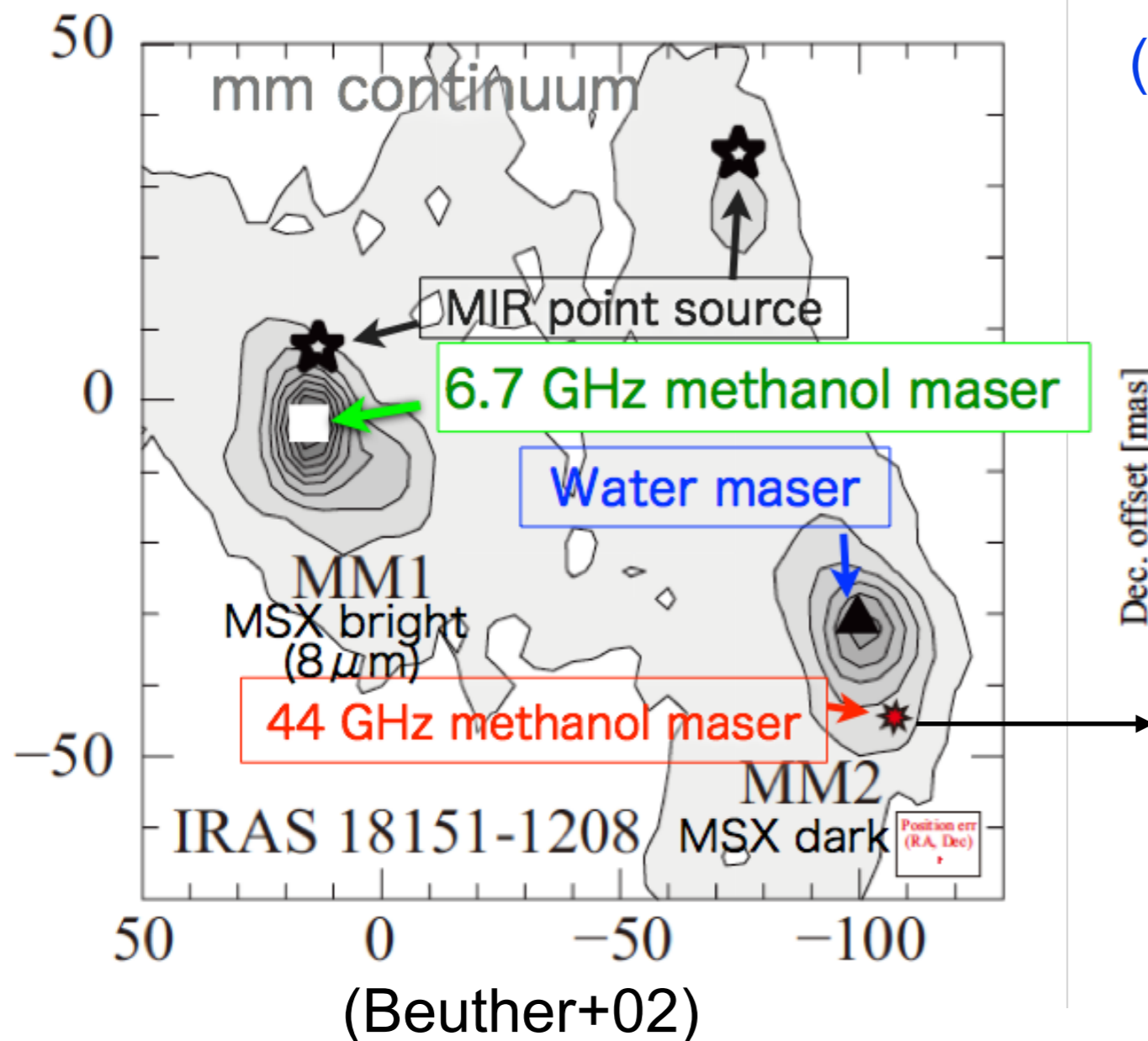




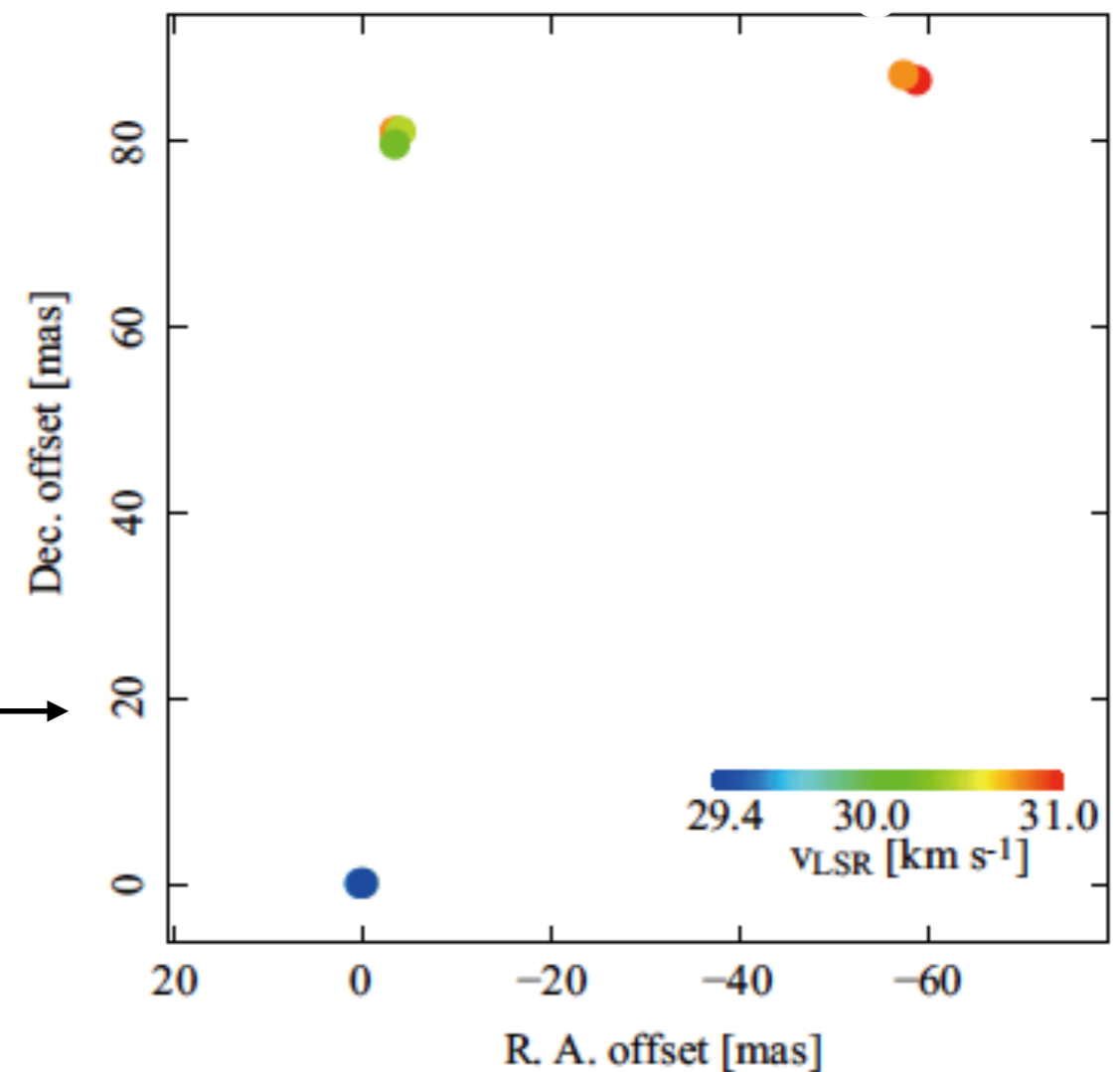


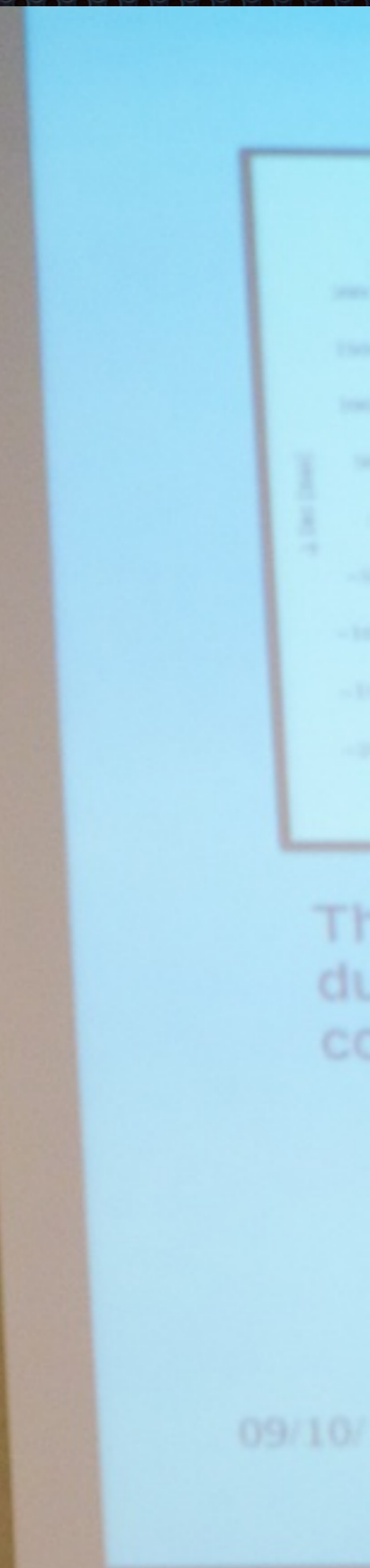
KaVA Imaging Obs

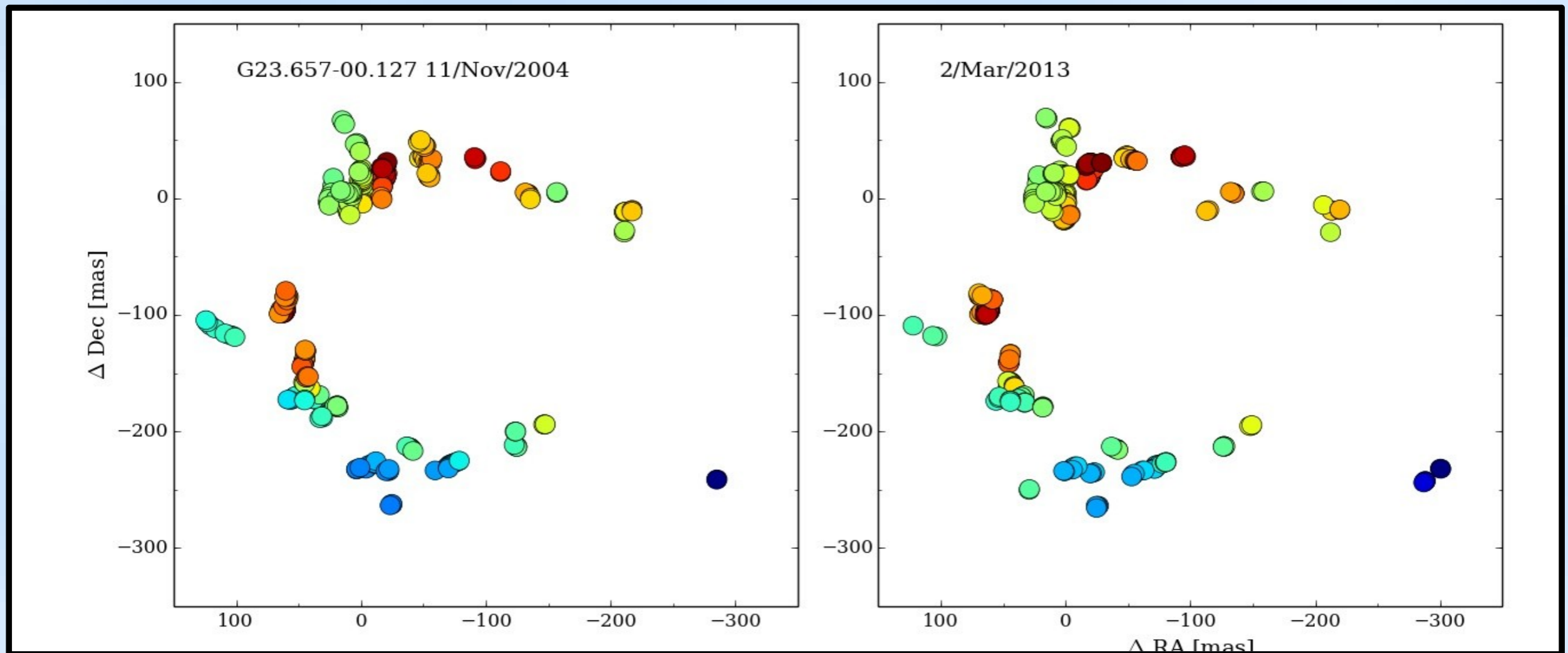
- IRAS 18151-1208 MM2 (G18.34+1.78SW)
 - 3 maser features detected in the FoV of $100 \times 100 \text{ mas}^2$
 - $\sim 5 \times 2 \text{ mas}^2$ ($15 \times 6 \text{ AU}^2$ @3 kpc), $(4-100) \times 10^8 \text{ K}$ cf) $2.7 \times 1.5 \text{ mas}^2$**the first imaging of Class I CH_3OH masers @mas**



(Matsumoto+14, ApJ, 789, L1)







316 maser spots (77.4 – 87.9 km/s)

Flux density: 4.6 Jy (max), 50 mJy (min)

(0,0) corresponds to the coordinates of the brightest spot in each epoch.

325 maser spots

2.2 Jy (max), 26 mJy (min)

Phase-referenced observations, however relative motions due to the Galactic rotation and parallax motions.

1 Masers observed with the EVN



ive

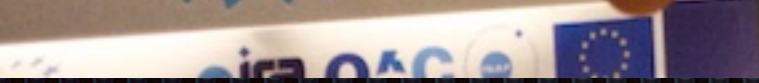
RadioNet

Transnational Access

Offers astronomers access to a selection of world-class radio telescopes and arrays covering an unprecedented range of wavelengths and resolving power.

www.RadioNet-eu.org







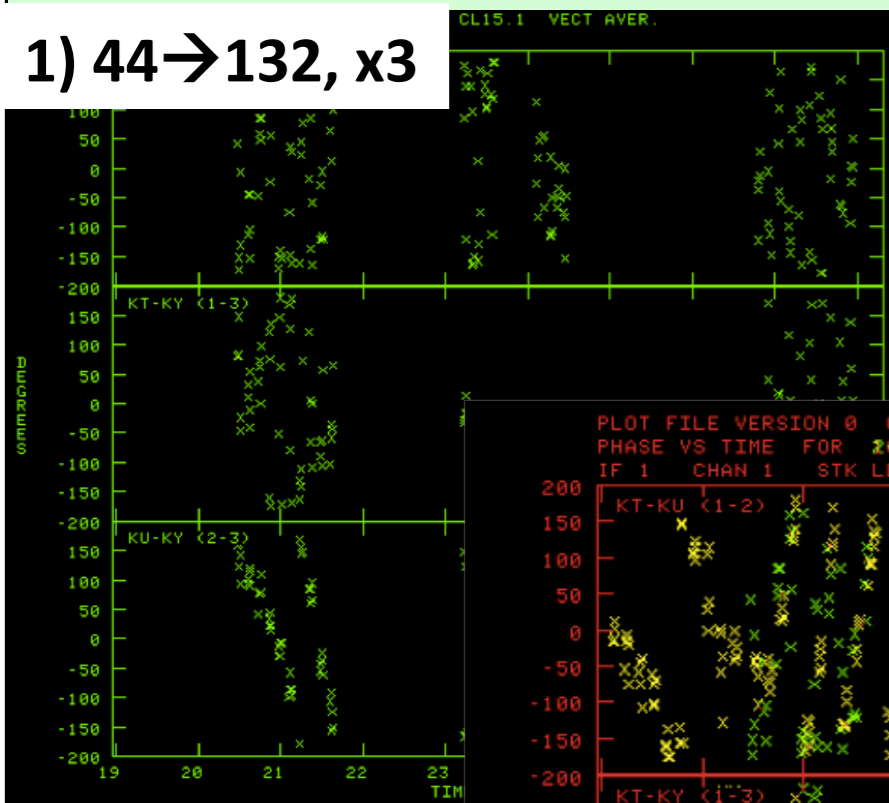




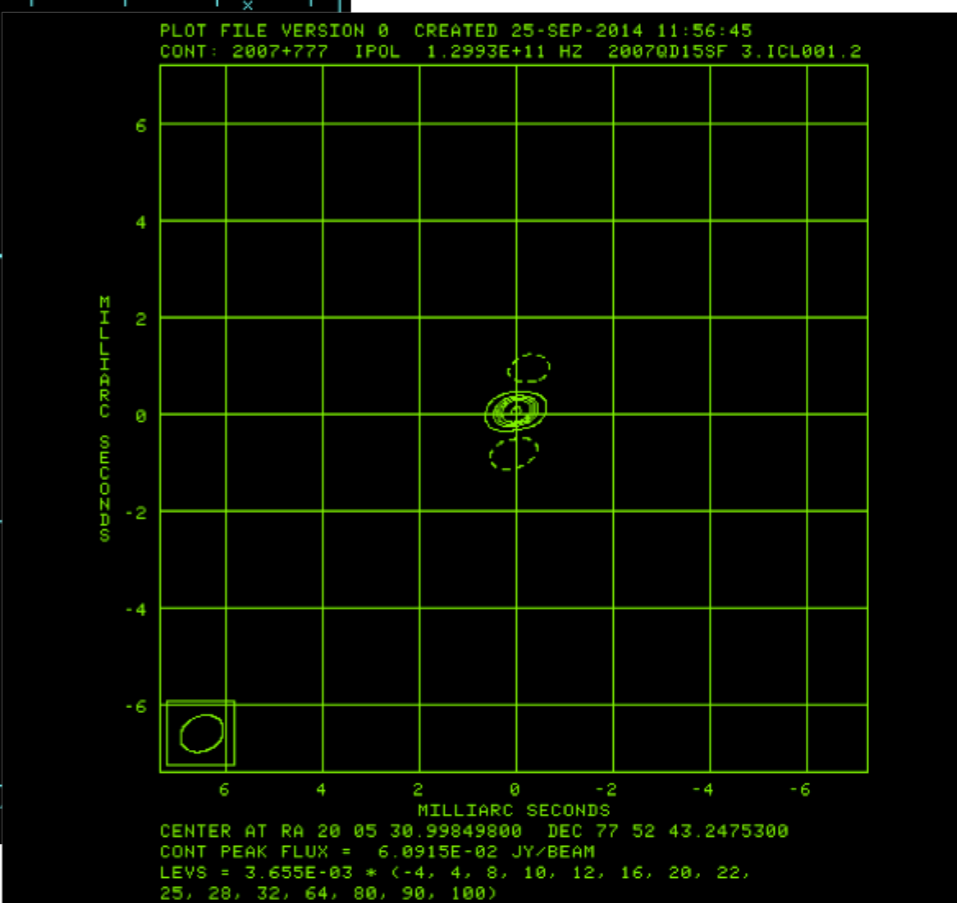
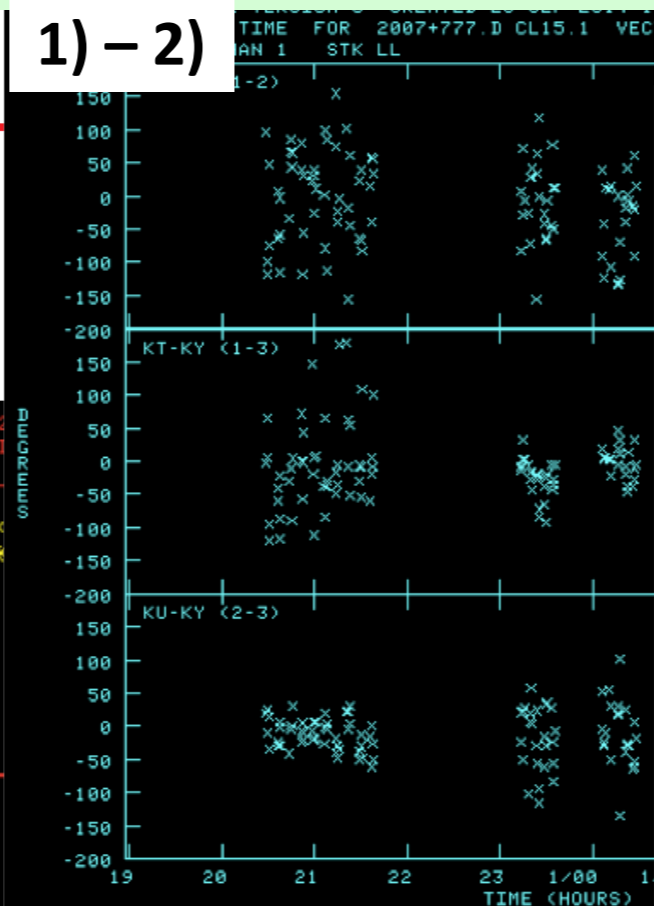


SFPR analysis – 132 GHz with 43GHz: 2007+777 (ref 6.3° away)

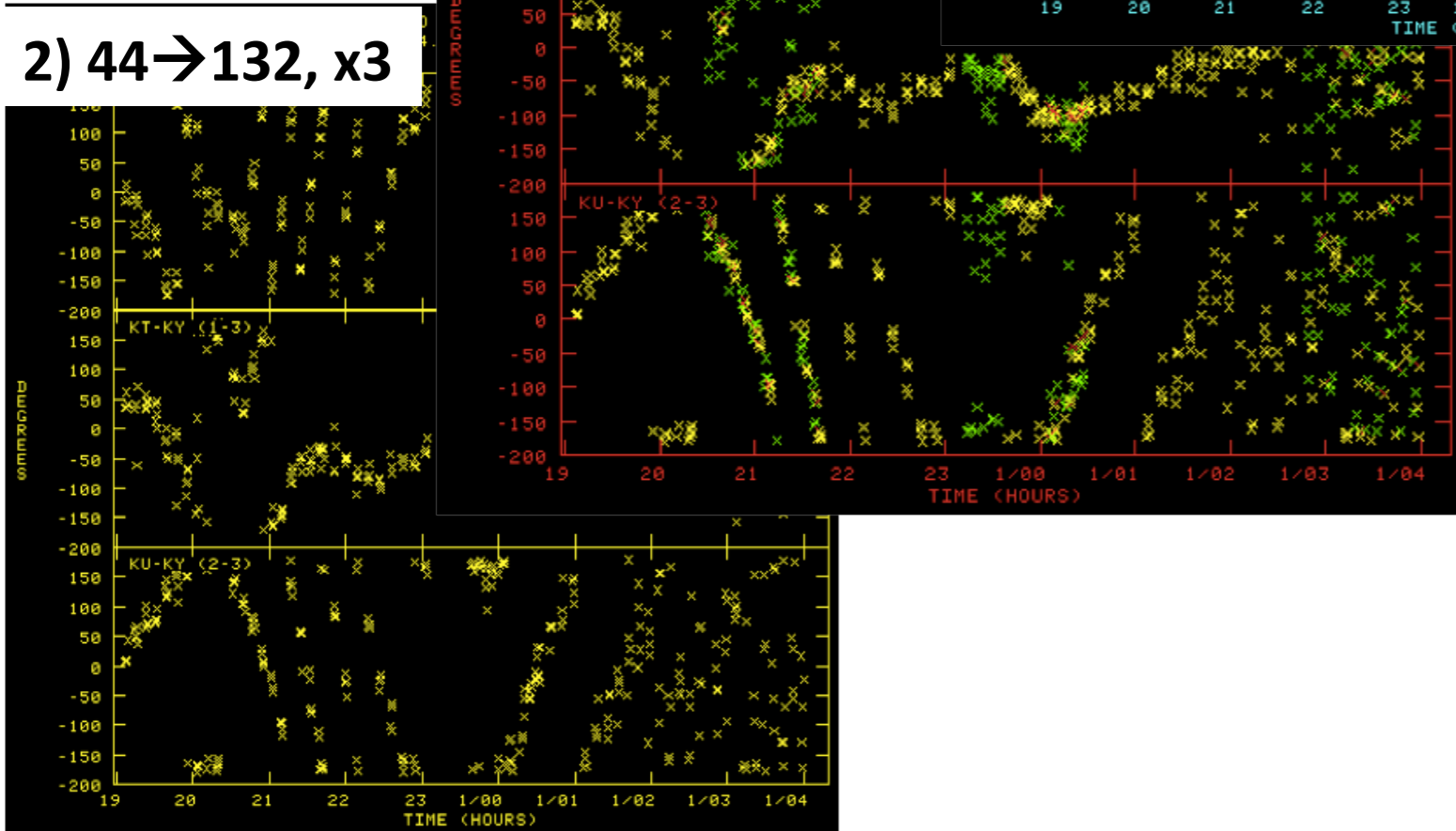
1) 44 → 132, x3



1) - 2)



2) 44 → 132, x3



SFPR-Map of 2007+777 at 132 GHz:

- Peak Flux ~ 61 mJy
- 85-90% recovery flux
- Astrometry ~ (0,50) μas

2007+777 (ref source 6.3° away)
No direct detections at 132 GHz

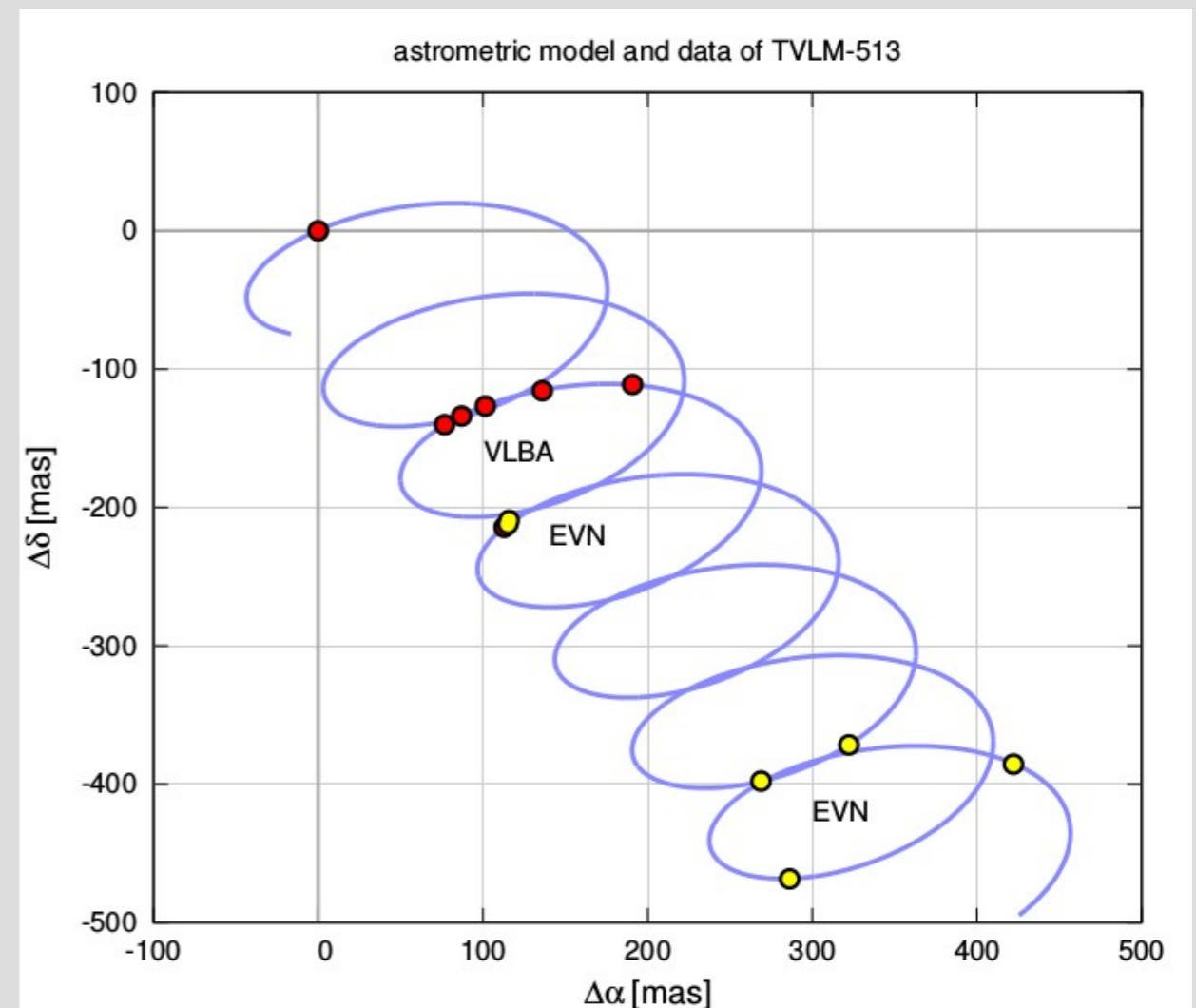


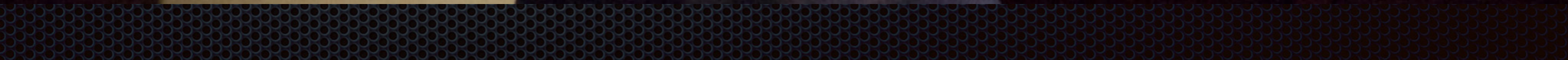


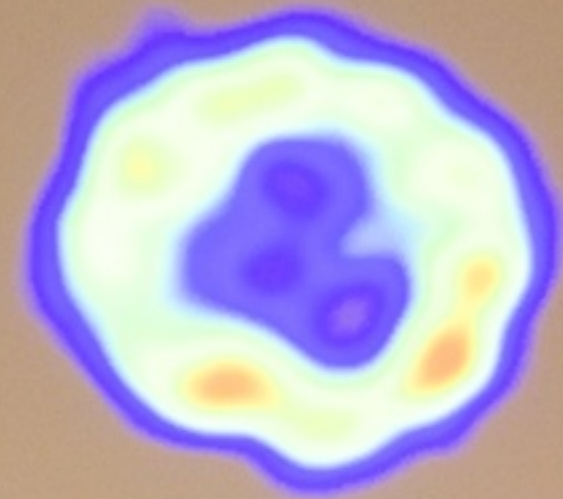
Radio Interferometry Survey of Active Red Dwarfs (RISARD)

First results - TVLM 513-46546

- M8.5 dwarf at distance 10.7pc
- target for dedicated astrometric project with VLBA at 8.4GHz (7 epochs in 2010-2011; Forbrich+ 2013)
- low significance pattern in the residuals suggests $\sim 2.6M_J$ with orbital period ~ 70 days)
- six additional epochs from RISARD (2011-2014)
- new astrometric model based on VLBA+RISARD measurements





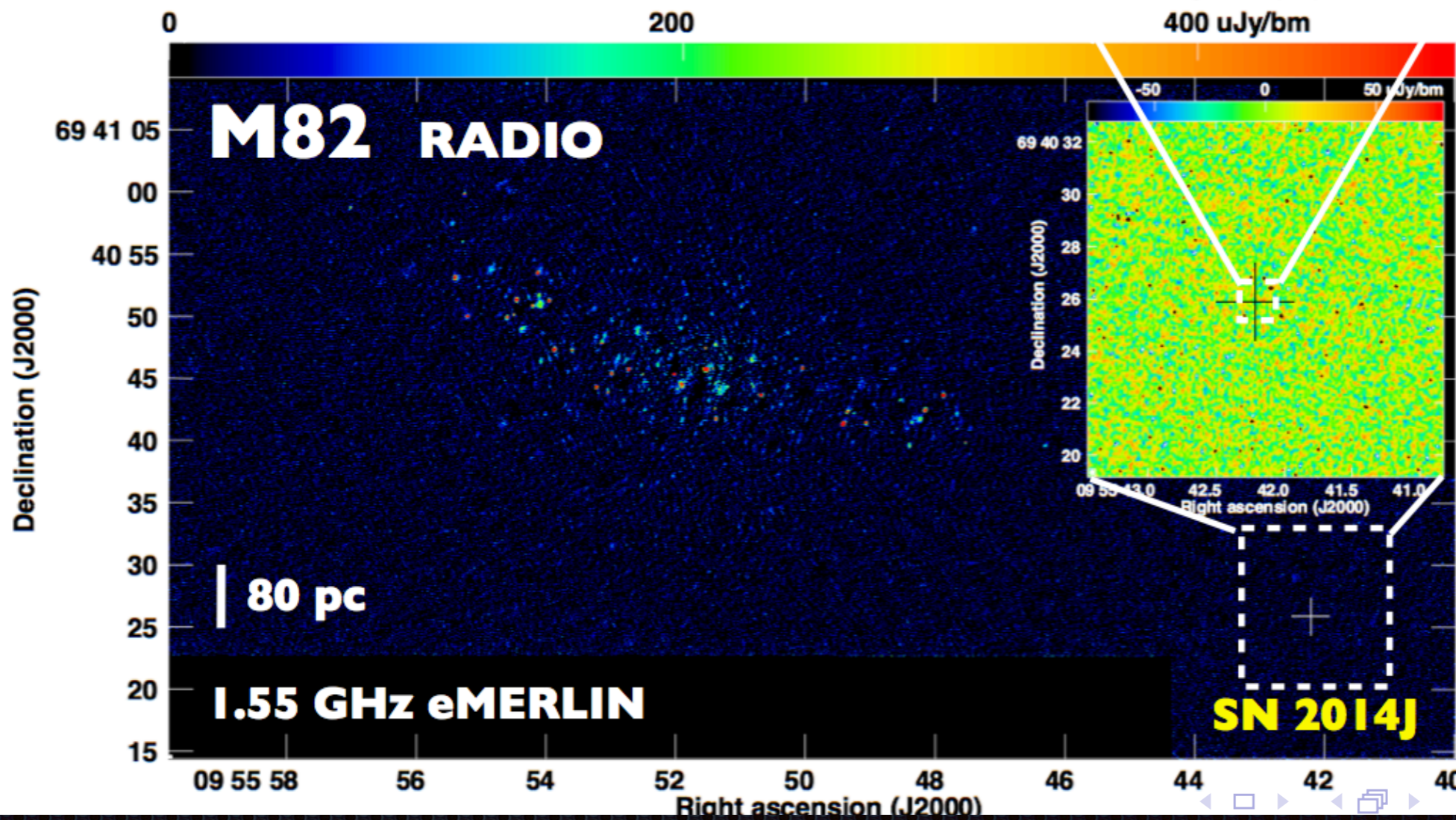
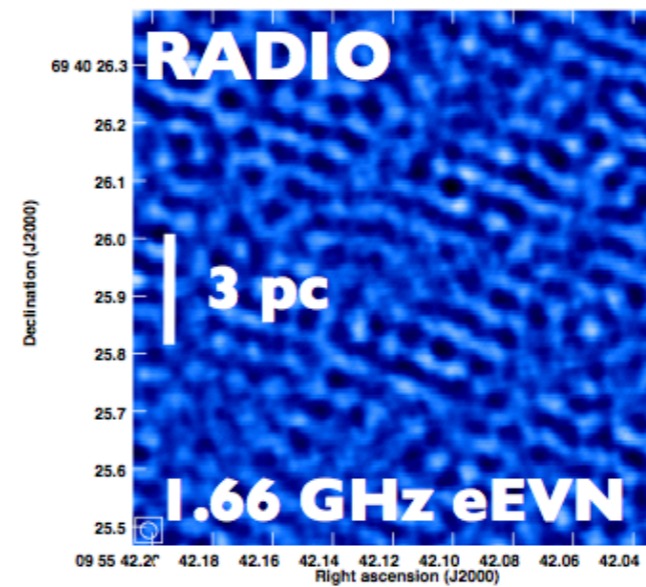
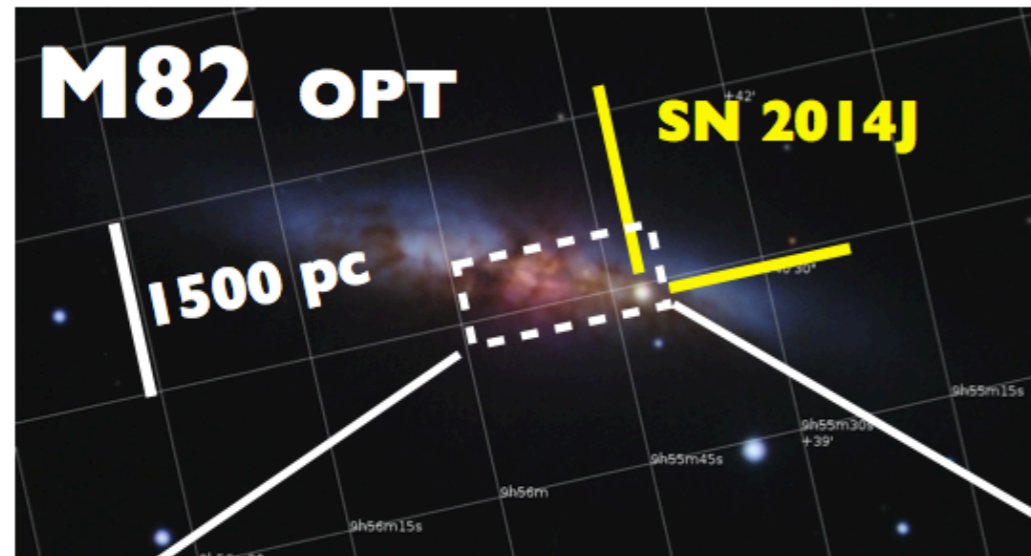


Perez Torres

- ✦ 2014J M82
- ✦ upper limit worth showing



EVN and eMERLIN obs-ns (Pérez-Torres et al. 2014)





Agenda for EVN Users Meeting
9th October 2014 15:30 – 17:00

- 1) **Introduction** – Tom Muxlow
 - a. EVN PC Update
 - b. Recent additions to EVN capabilities
 - c. Proposal statistics

- 2) **Correlator and Proposal Tool Updates** – Bob Campbell

- 3) **EVN Scheduling** – Alastair Gunn

- 4) **Open Discussion** – Miguel Perez-Torres (Motivator)
 - a. Recent proposal numbers (suggested by Tom Muxlow)
 - b. Calibration Issues (ANTAB tables) (suggested by Robert Schulz)
 - c. Global VLBI at ~ 150 MHz (suggested by Olaf Wucknitz)
 - d. mm-band improvements (suggested by Richard Dodson/Maria Roija)

- 5) **AOB**





A. Barkovets (SINUS) B. Campbell (ZVE) M. Grolotti (DIAF-IRA)
Z. Shen (Sh + IS) R. Lindqvist (OSO) A. Lubanov (MPSR) - Secretary
A. Polesko (ASTROK) A. Polubov (St Petersburg) T. Muslow (BCA/AMERLIN) - Chairperson

"All Large" Members
Angela Bassani (DIAF SIPS Rome) R. Pérez-Torres (SAA-CSIC)
S. Pez (POPE) S. Humphreys (ESO)

Representatives
A. Sam EVN Scheduler
B. Campbell EVN Coordinator at ZVE

Recent Appointments
Chairperson rotates on January 1st 2015
Michael Lindqvist replaces Tom Muslow

IBAO Representatives
R. Chouan - IBAO Scheduler
Alex Van Salfemans & Tracy Heister

Out of Session Observing

Out-of-Session observing time (up to a maximum of 144 hours/year), is now available to all proposals.

Proposals requesting Out-of-Session observing time must provide full scientific (and technical if appropriate) justification as to why observations must be made outside regular sessions.

Proposals will only be considered for dates occurring after the regular EVN session that follows the proposal deadline. Observations requiring much shorter lead times should be submitted as "Target-of-Opportunity" proposals.

For this and all developments shown here - see the recent call for proposals:
<http://www.evs.org/observing/>







EVN Proposal Pool
Database of all eligible observations
(regular sessions, eVLBI, CoS, tri...

Latest Approved Proposals
from EVN-PC

Historical Proposals
i.e. that...



user meeting

- Extremely important for us
 - Hard to squeeze into programme
- Level of criticism low
 - Not necessarily a good thing....

Sport, Party





























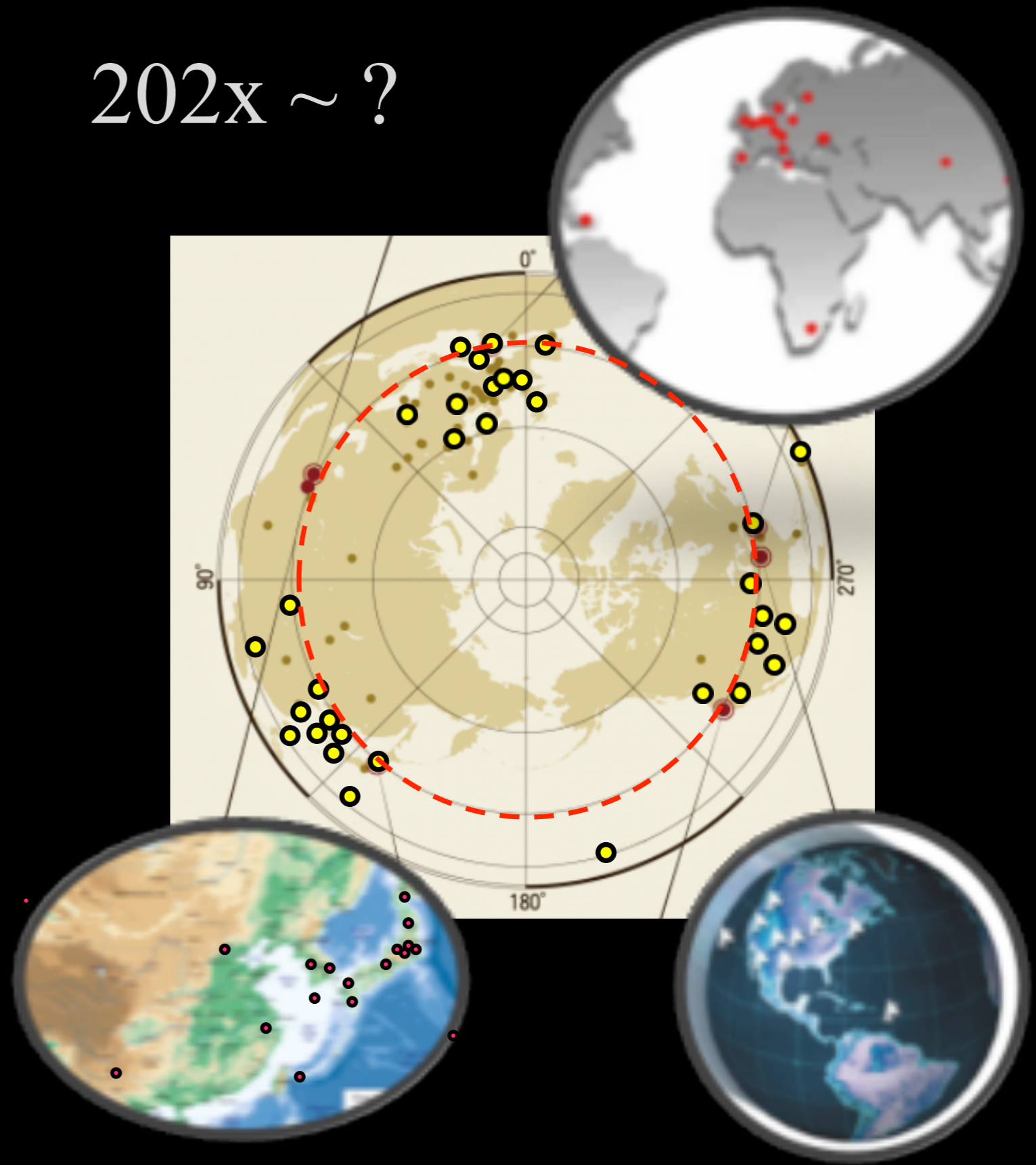
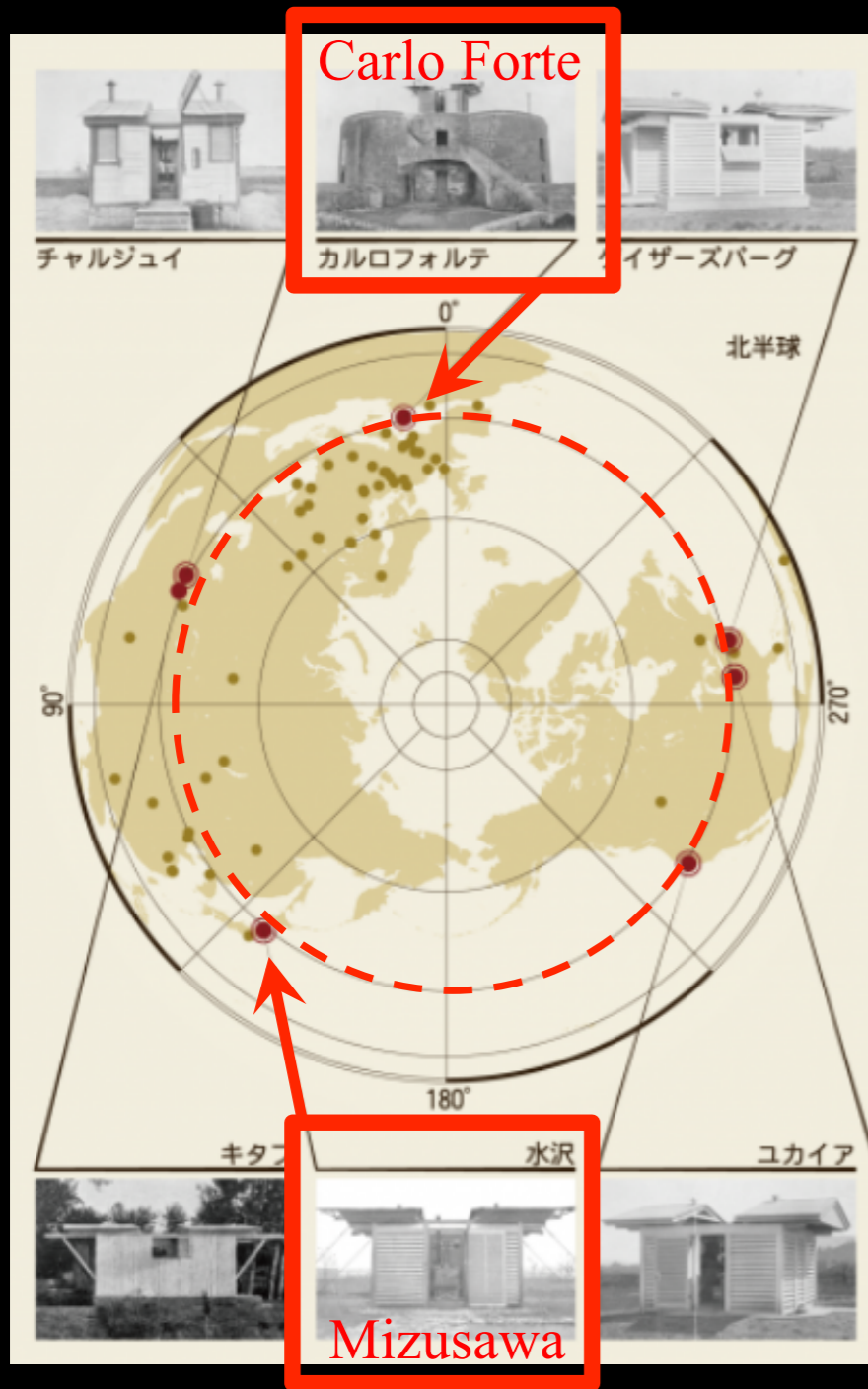






1899~

202x ~ ?



Corresponding to ~7% SKA in collecting area !

• Status of the project

	Sum masses
AB Dor A/C	
AB Dor Ba/Bb	✓
ID 160934	✓
γ Draconis	✓
Pegasus	in progress
Andromedae	observation sch

...re dynamical masses we have
...the theoretical models.









→ $v=3$ is not affected

But $v=1$ & 2 are displaced

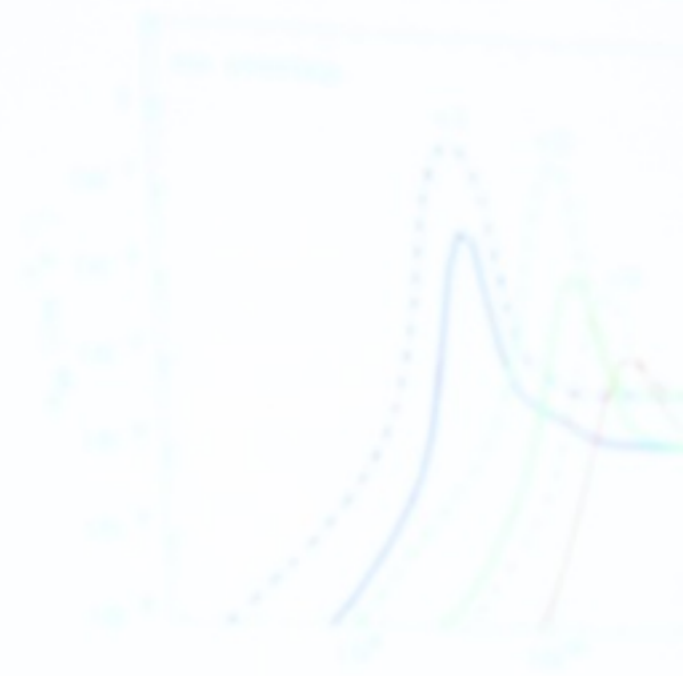
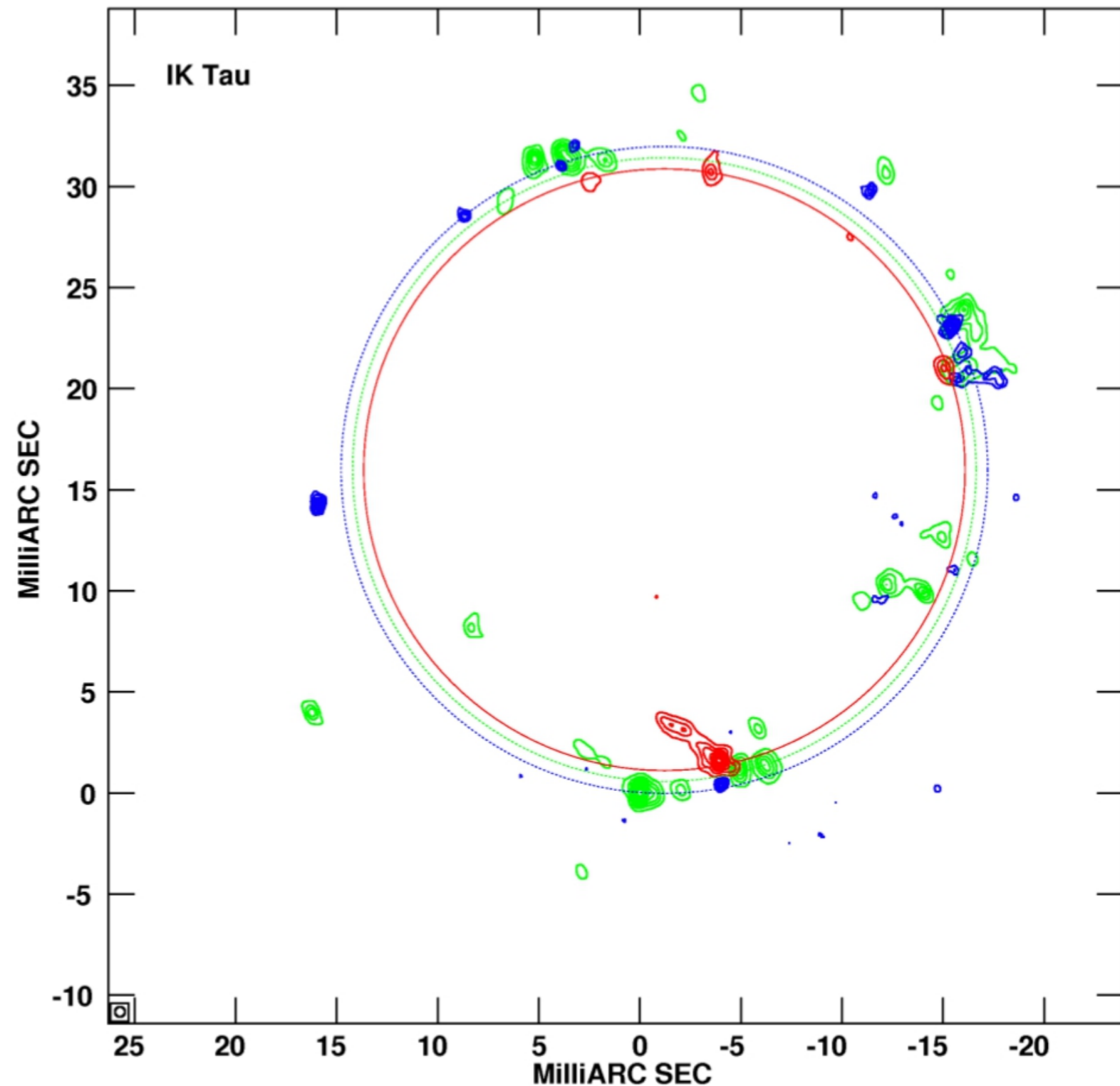


Fig. 4. Effects of the $2D \times 2D$ line overlap on the excitation of the $\nu=1$ (blue, green and red respectively), $\nu=2$ (red) and $\nu=3$ (blue) transitions as a function of D . Density is shown. Left panel: model results including the line overlap.



Very similar distribution for SiO $J=1-0$, $v=1$, $v=2$ and $v=3$!

And in IK Tau,
 $v=3$ clearly show
up in a slightly
inner ring!



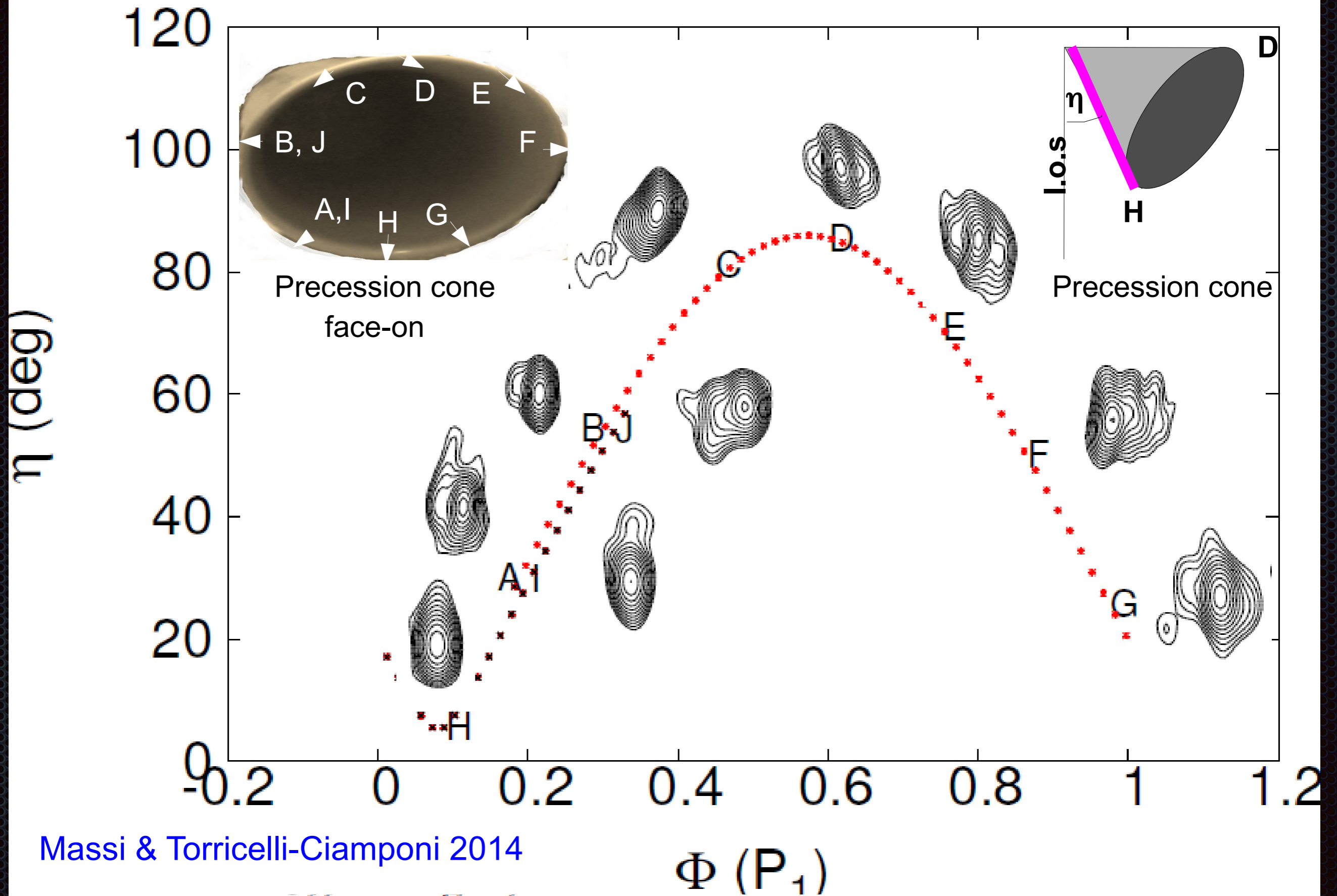
— $v=1$ $J=1-0$
— $v=2$ $J=1-0$
— $v=3$ $J=1-0$

Desmurs et al. 2014

Fig. 3. VLBA maps of SiO $J=1-0$ $v=1$ (in blue), $v=2$ (in green), and $v=3$ (in red) maser emissions from R Leo (upper left, November 13, 2009), TX Cam (upper right, January 31, 2010), U Her (lower left, April 17, 2011), and IK Tau (lower right, November 04, 2011). To ease the comparison between the three maser lines, using the same color code, we plotted the fitting rings obtained with ODRpack for each maser transition (see Table 2).







Massi & Torricelli-Ciamponi 2014

Results: the rapid rotation in position angles of VLBA maps

+180°



-90°

<http://tevcat.uchicago.edu>

(TeV) sky as seen by Cherenkov

61 galactic, ~30 unidentified

Introduction





RadioNet

Transnational Access
Offers astronomers access to a selection of world-class radio telescopes and arrays covering an unprecedented range of wavelengths and resolving power.

European Commission and
European Research Programme (ERC) Grant 640101

Standard Offer

www.RadioNet-eu.org



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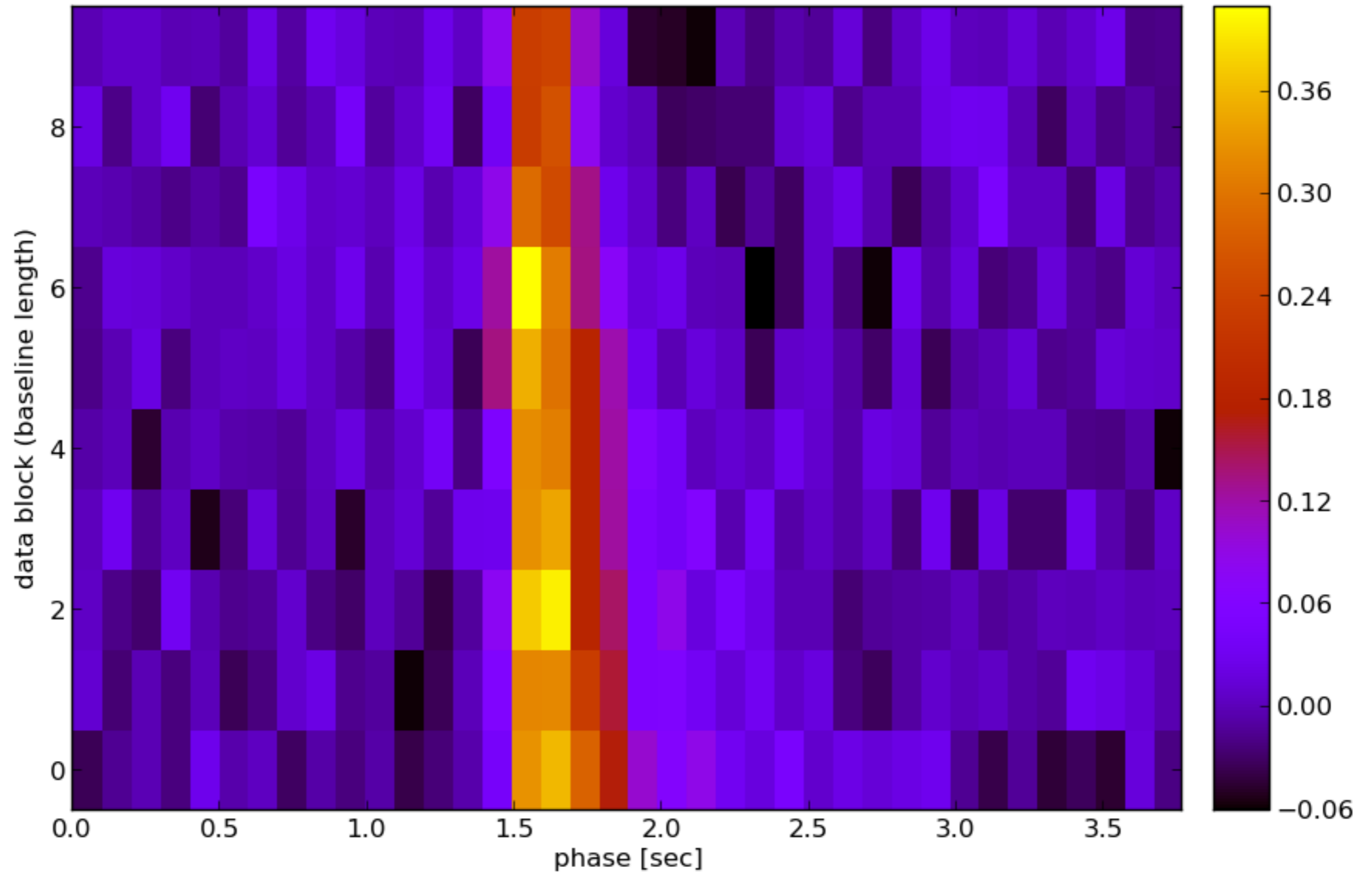
RadioNet is funded by the **European Commission** under the **Seventh Framework Programme (FP7)**, Contract no. 262206.

RadioNet Office

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53121 Bonn
Germany
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Profile as function of τ and (u, v)





Thanks!

We like your science

Can't wait to see the papers

We need your exciting proposals!

JIVE 20 YEARS



1993

2013

Seasonal Greetings



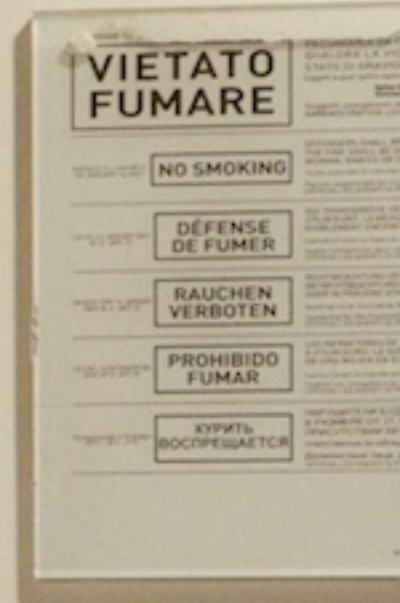
Acknowledge the SOC.

- EVN directors are/assign the SOC
 - Will also select next SOC chair...
- Feretti
- Tarchi
- Bietenholz
- Camilo
- Charlot
- Colomer
- Garrington
- Hong
- Ipatov
- Kunert-Bajraszewska
- van Langevelde
- Lindqvist
- Lobanov
- Muxlow
- Schueler
- Tornikoski
- Vermeulen
- Na Wang

Thank the LOC!

- ✦ Andrea Tarchi
- ✦ Marco Bondi
- ✦ Marta Burgay
- ✦ Tiziana Coiana
- ✦ Gianni Alvitoi
- ✦ Stefano Parisin
- ✦ Gabriele Giovannini
- ✦ Marcello Giroletti
- ✦ Carlo Migonti
- ✦ Matteo Murgia
- ✦ Jacqueline Casado
- ✦ Tiziana Venturi

And Observatory of Cagliari Staff!

















Thank the LOC!

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- ✦ Tiziana Venturi

And Observatory of Cagliari Staff!

- ✦ The end..
- ✦ Have a safe trip!
 - ✦ may your luggage look after you
- ✦ See you next time!

