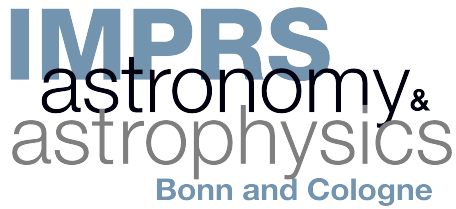


NGC1052

A Twin-Jet system from 1.5 GHz to 86 (230) GHz

Anne-Kathrin Baczko

(MPIfR Bonn, Univ. Würzburg)

In Collaboration with:

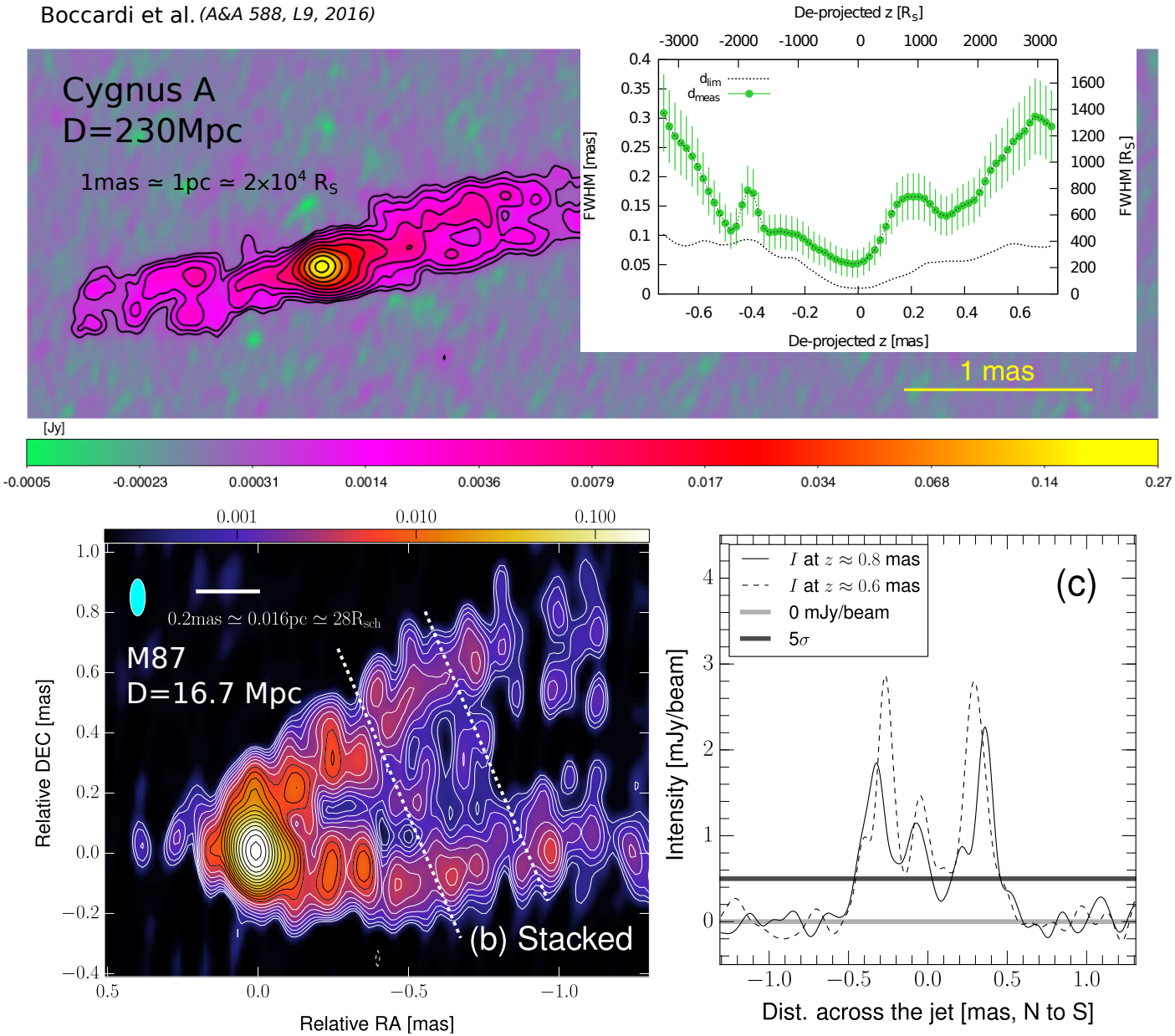
R. Schulz [1], E. Ros [2], M. Kadler [3], C. M. Fromm [4,2], M. Perucho [5], J. Wilms [6]

[1] *ASTR N,* [2] *MPIfR,* [3] *Uni. Würzburg,* [4] *Univ. Frankfurt,* [5] *Univ. Valencia,* [6] *Univ. Erlangen-Nürnberg*

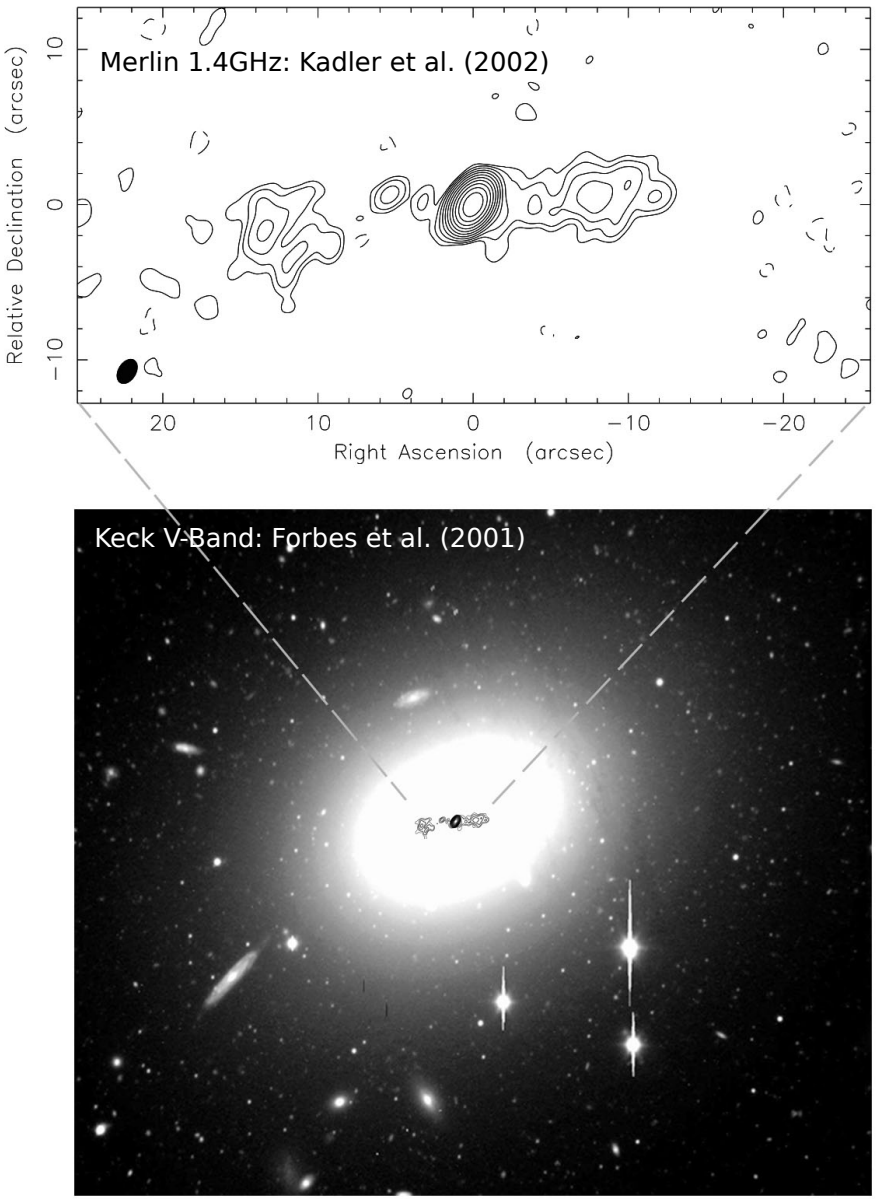
October 10, 2018

AGN at high resolution (86 GHz with the GMVA)

Boccardi et al. *(A&A 588, L9, 2016)*



NGC 1052: A Twin-Jet system in the plane of the sky



- Distance: $\sim 20\,\mathrm{Mpc}$
  $1\,\mathrm{mas} \equiv 0.11\,\mathrm{pc} \equiv 8000 R_\mathrm{S}$
- Central BH Mass: $\sim 10^{8.2}\mathrm{M}_\odot$
- LINER, Core dominated
- Emission gap at cm – λ
- $2\,\mathrm{cm}$ Survey (MOJAVE)
  $v_\mathrm{app} = 0.26\,\mathrm{c}$

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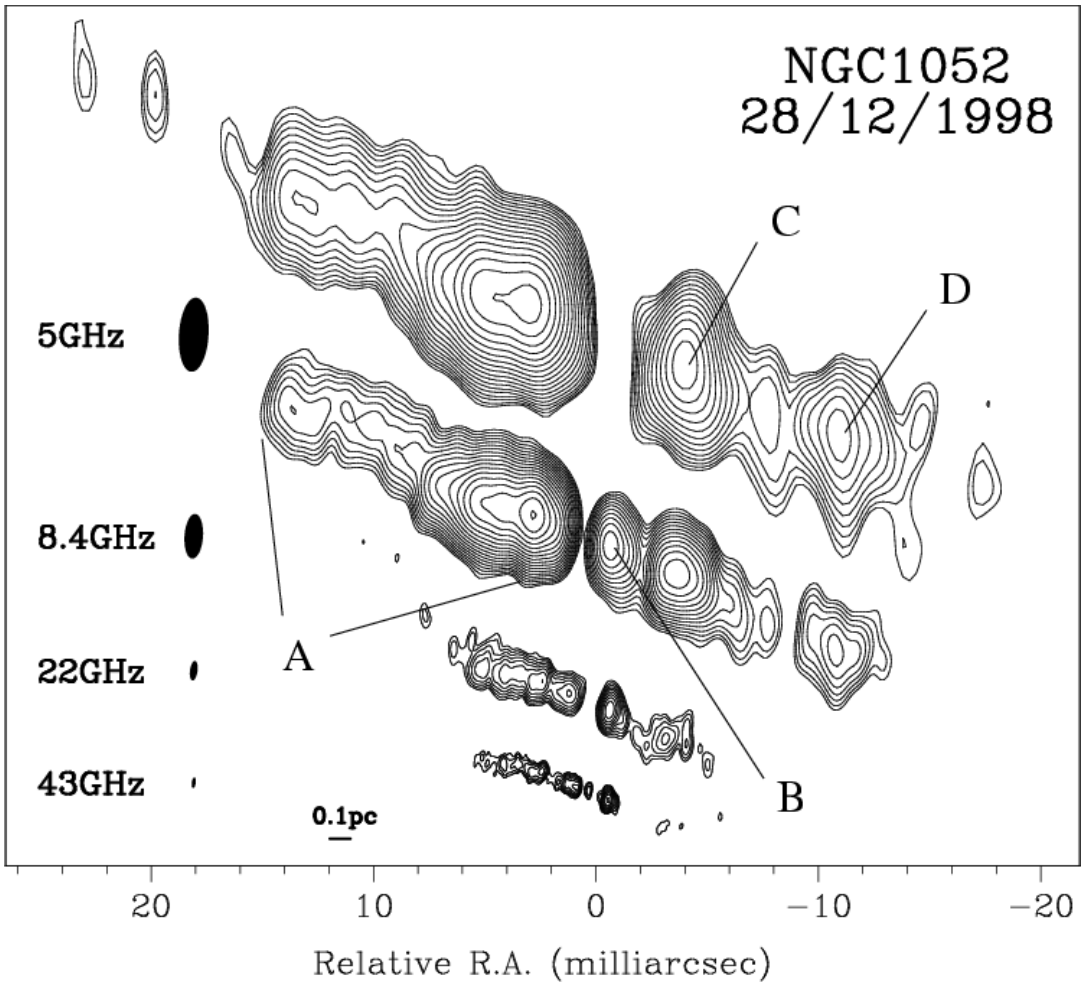

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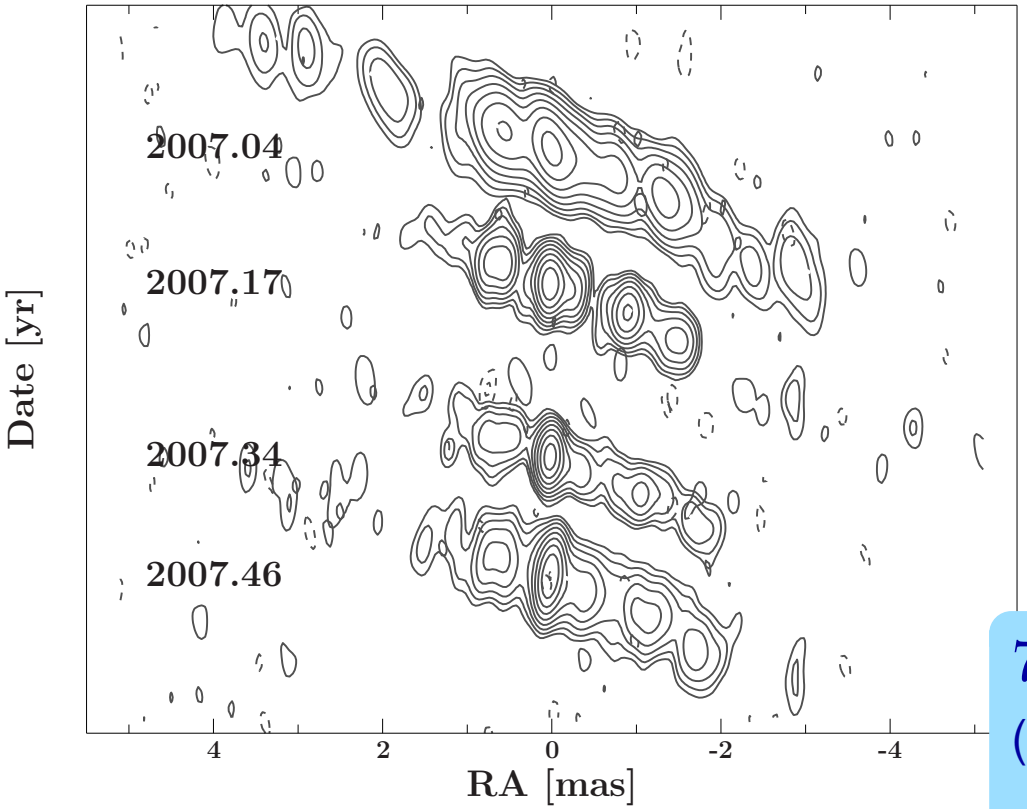

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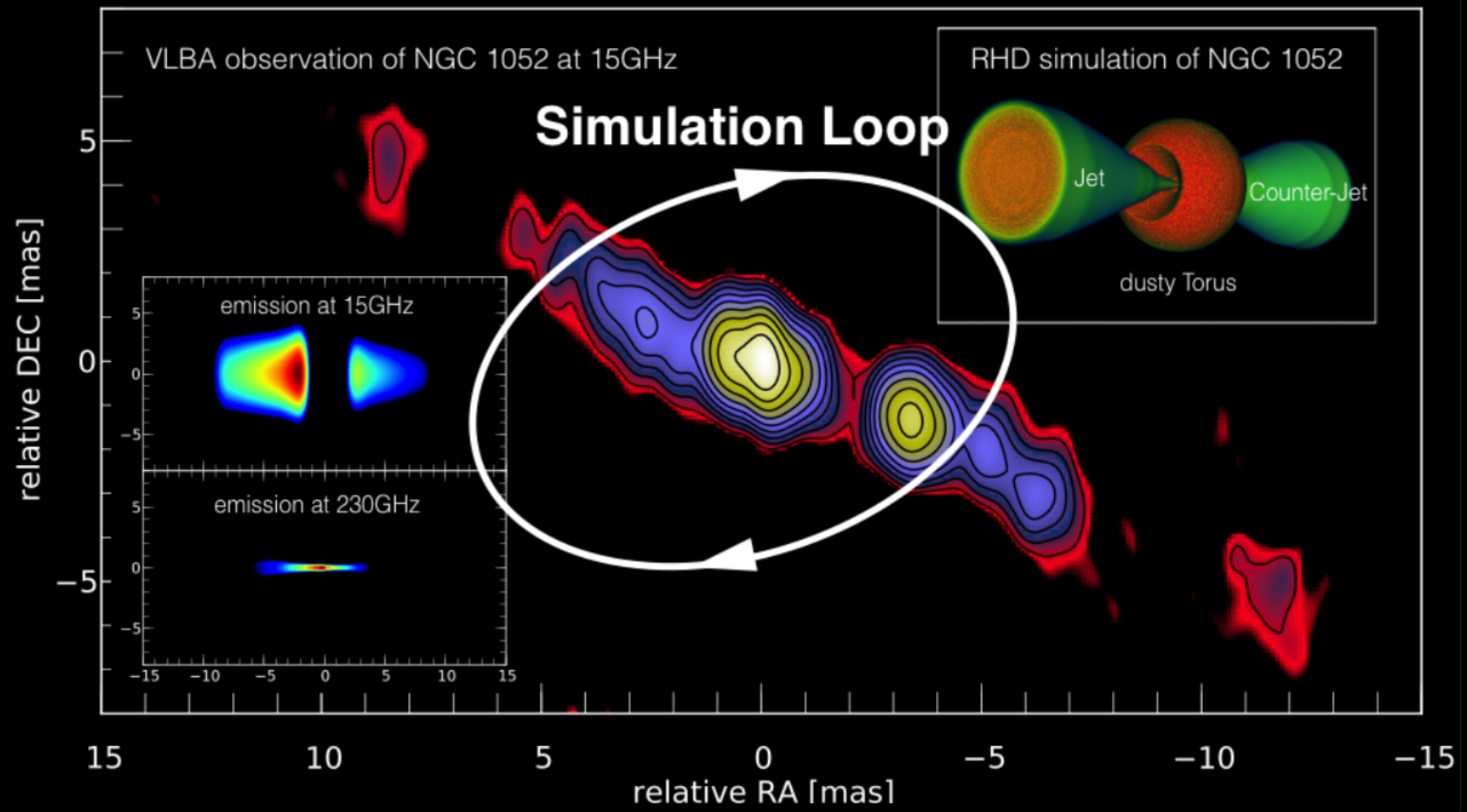
7 mm monitoring
(Baczko+, A&A subm)
$\rightarrow 0.23\,\text{c} \leq v_\text{app} \leq 0.66\,\text{c}$
$\rightarrow$ Jets appear asymmetric



Ref: Radiomap MOJAVE (Lister et al. 2009)

Christian M. Fromm, Manel Perucho: Observations ↔ Simulations

Understanding Jet formation & Symmetry in NGC 1052

Observational campaign:

Date	Instrument	Obs. code	Frequency [GHz]
29 epochs			
2005-2009	VLBA	BR099-130	22 / 43
2016/11	RadioAstron	GB079	22
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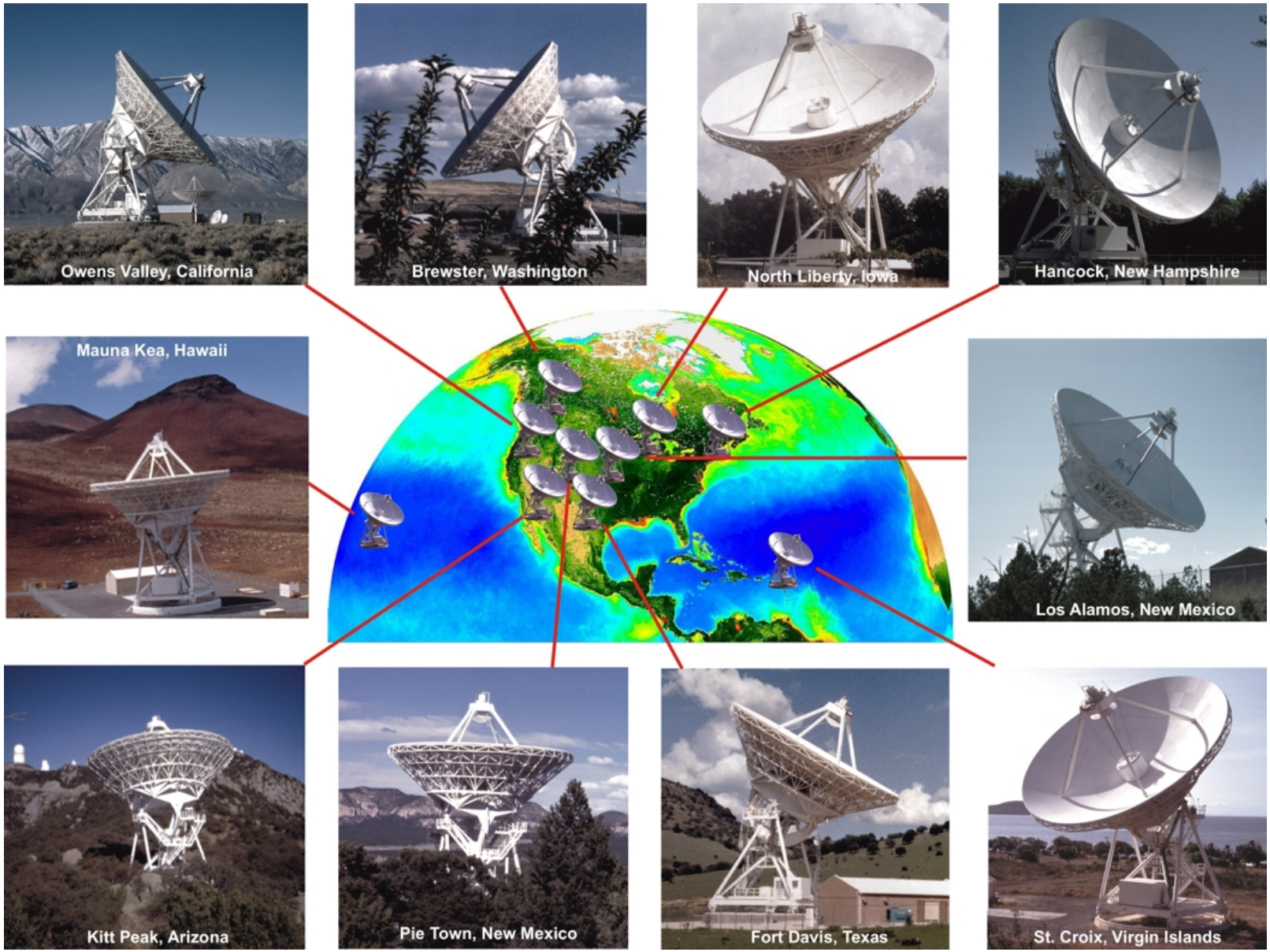
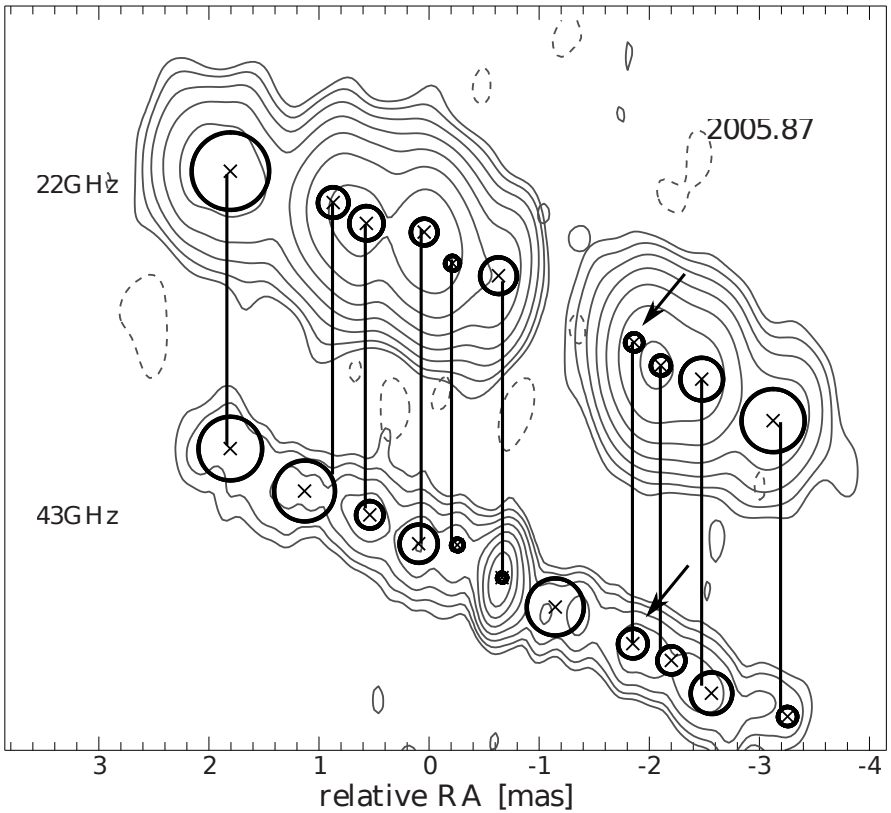
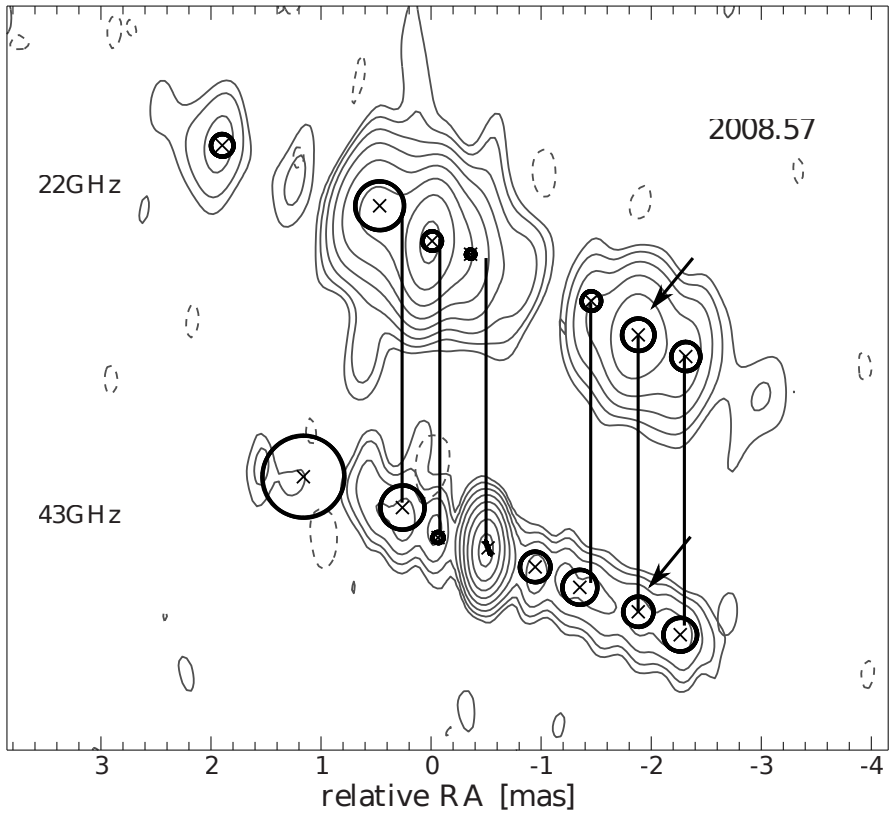
The Very Long Baseline Array (VLBA)

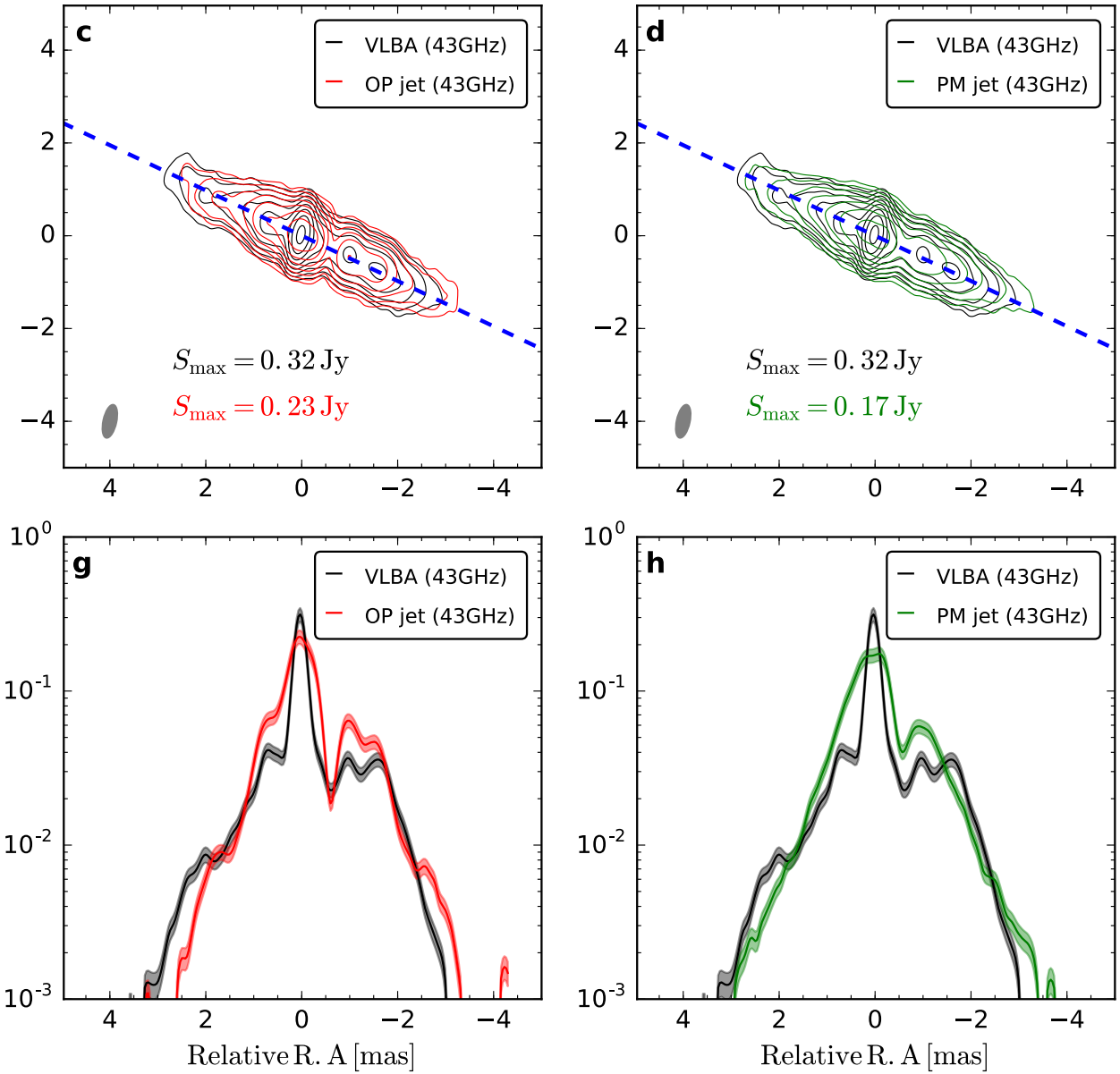


Alignment: 43 – 22 GHz





Modeling NGC 1052 with evolutionary algorithms



PM

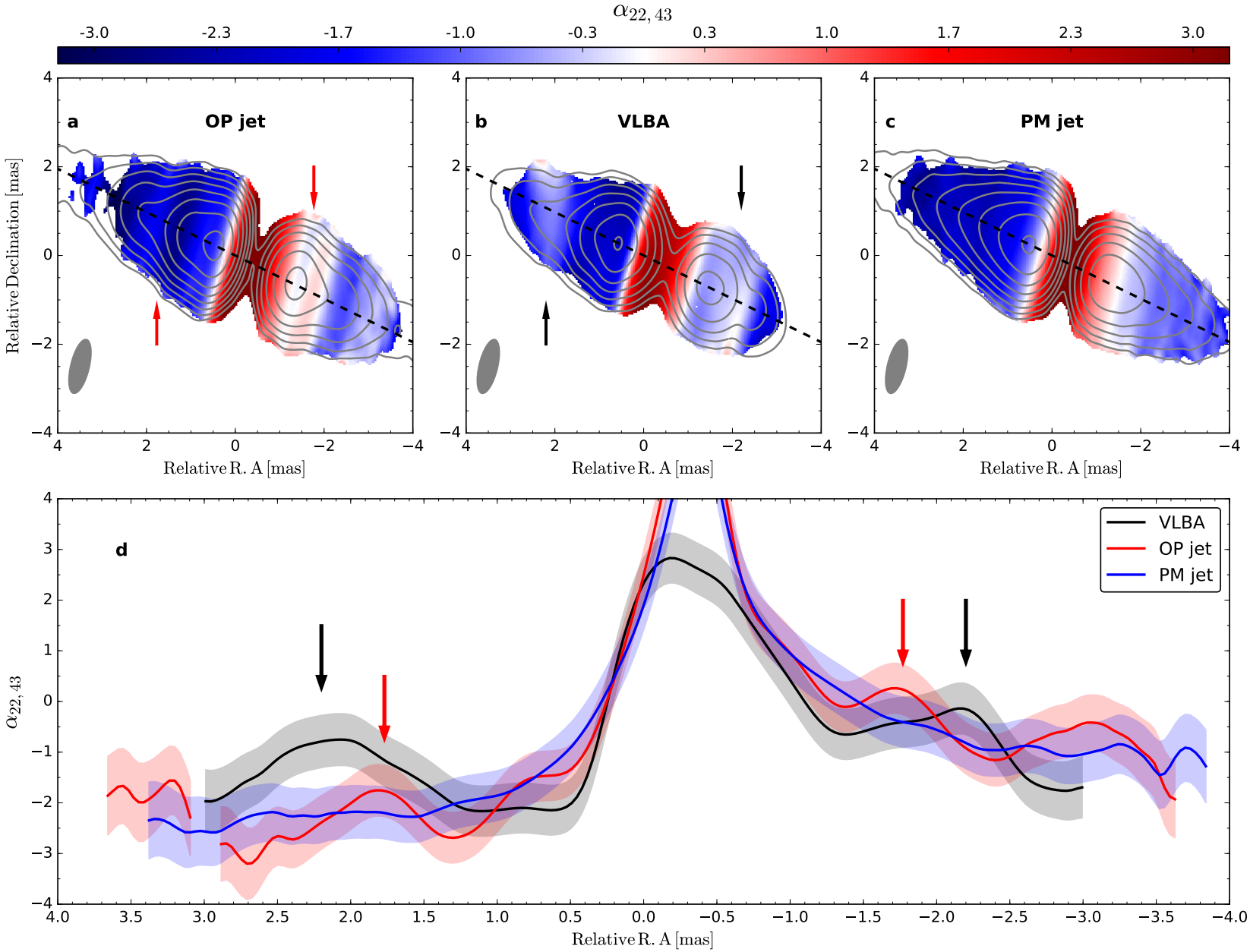
(Pressure-matched)

OP

(Over-pressured)

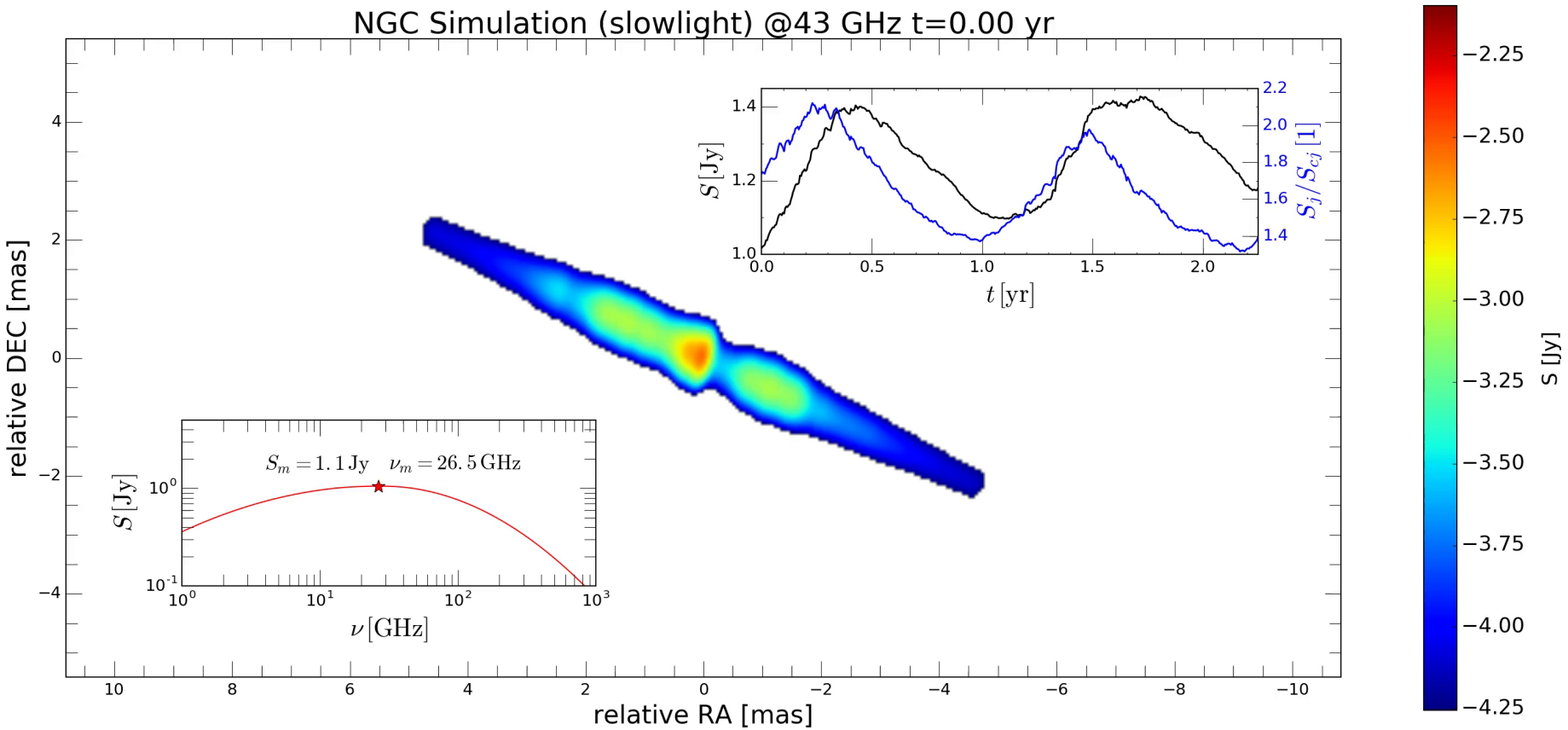
C. Fromm+ (A&A in prep)

Modeling NGC 1052 with evolutionary algorithms



C. Fromm+ (A&A in prep)

Time variable shock waves



Christian M. Fromm, Univ. Frankfurt

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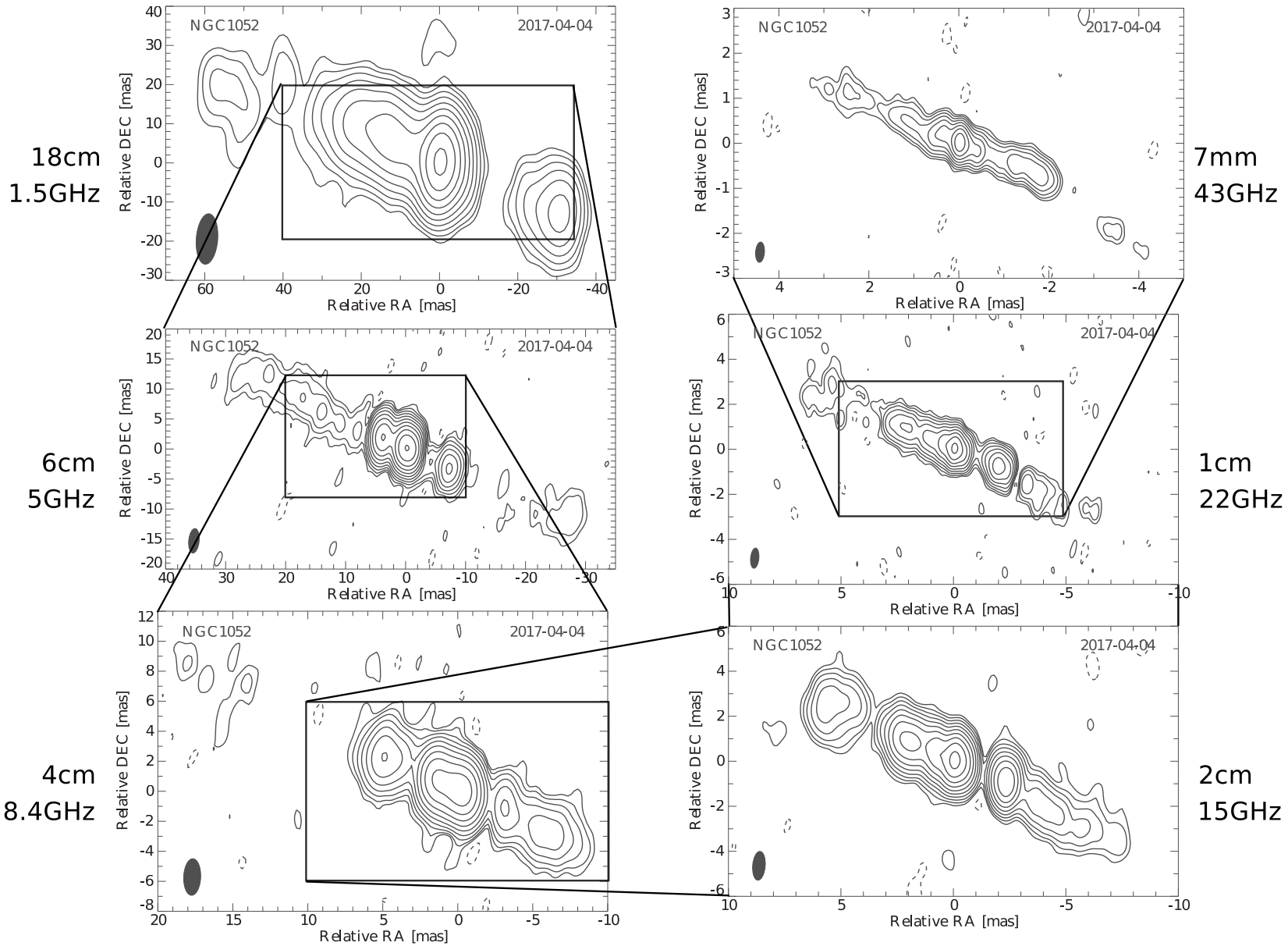
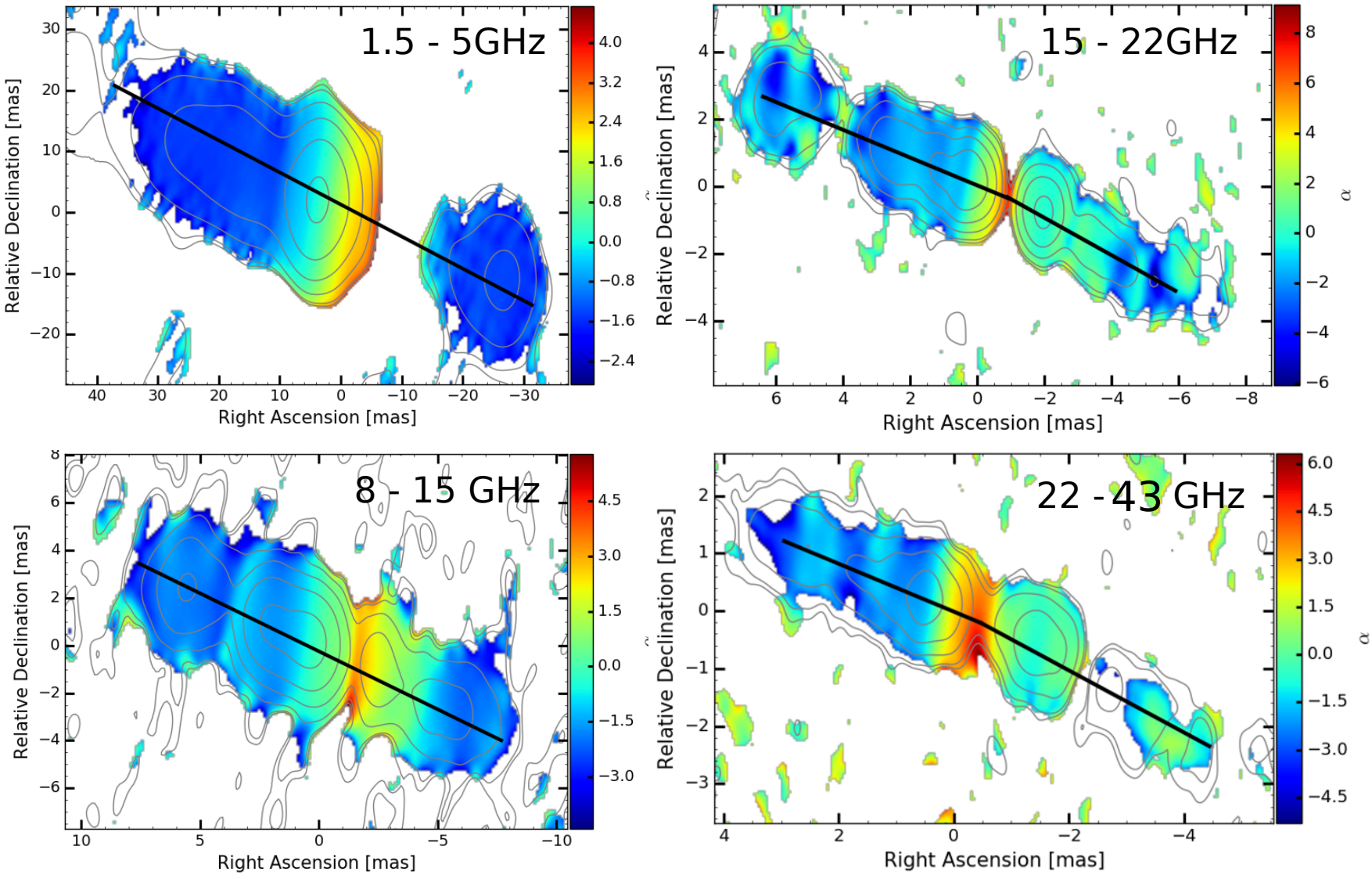
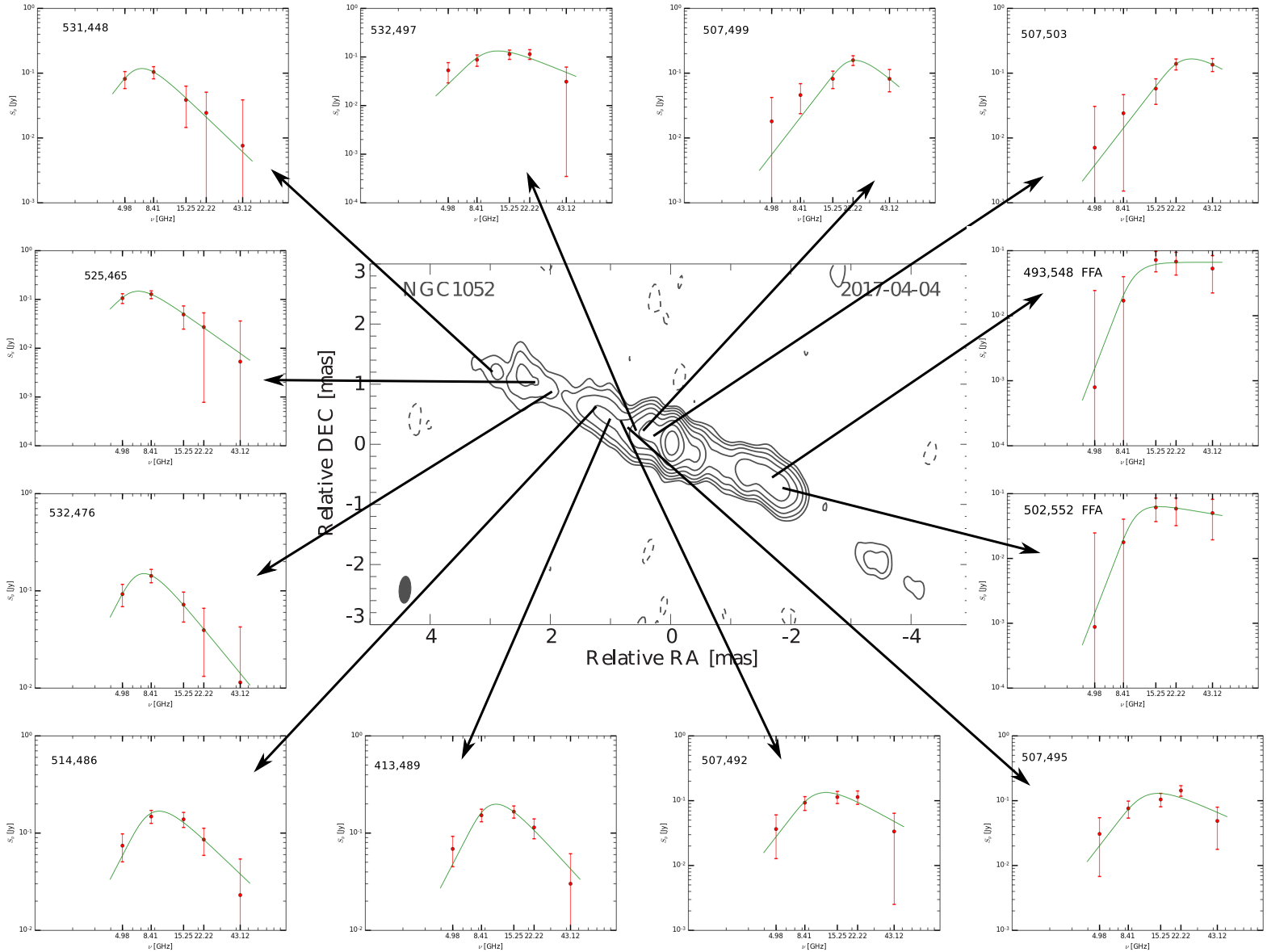
VLBA – observed on 4.4.2017



VLBA – Spectral Index Maps



VLBA – Spectrum



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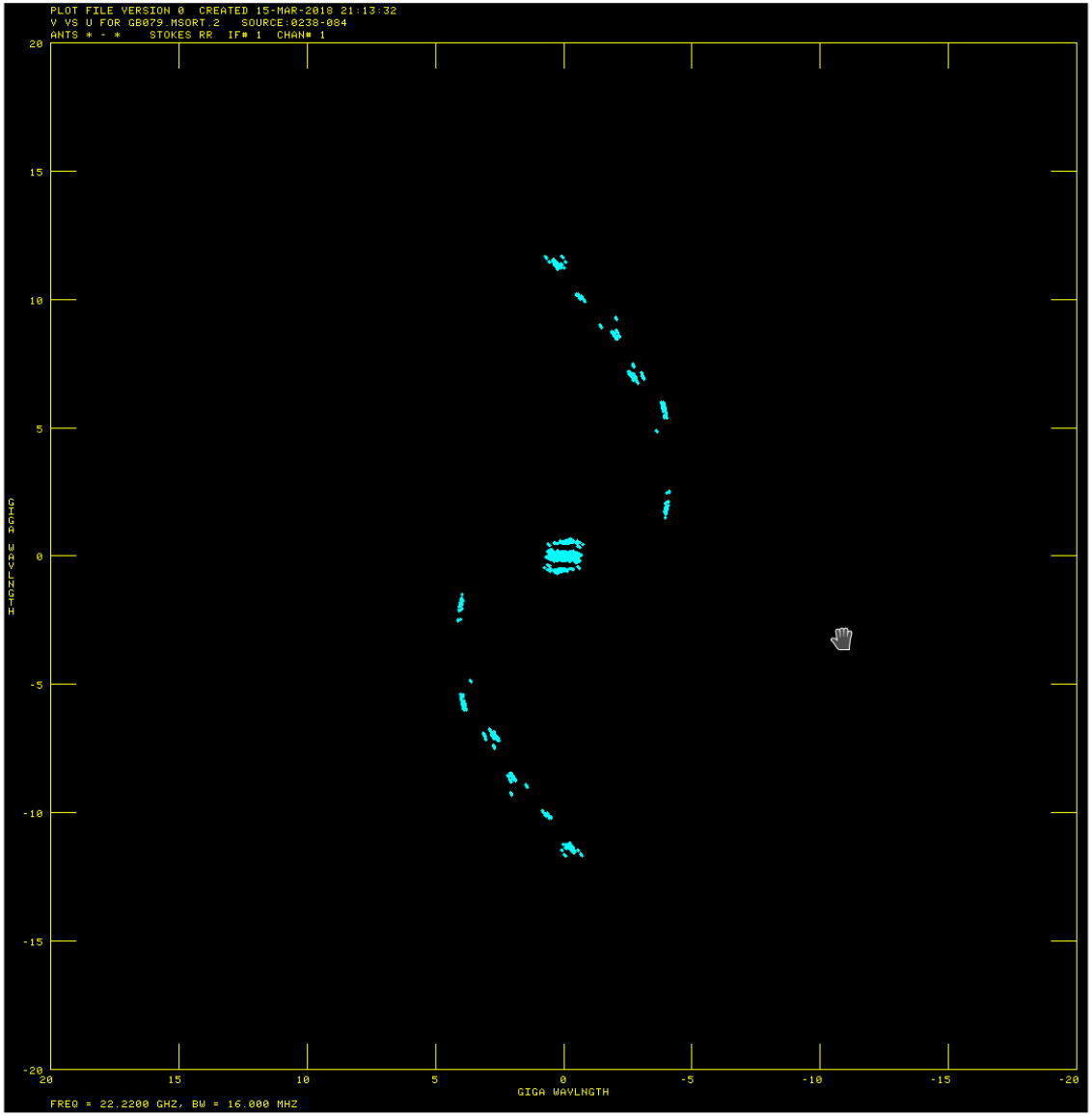
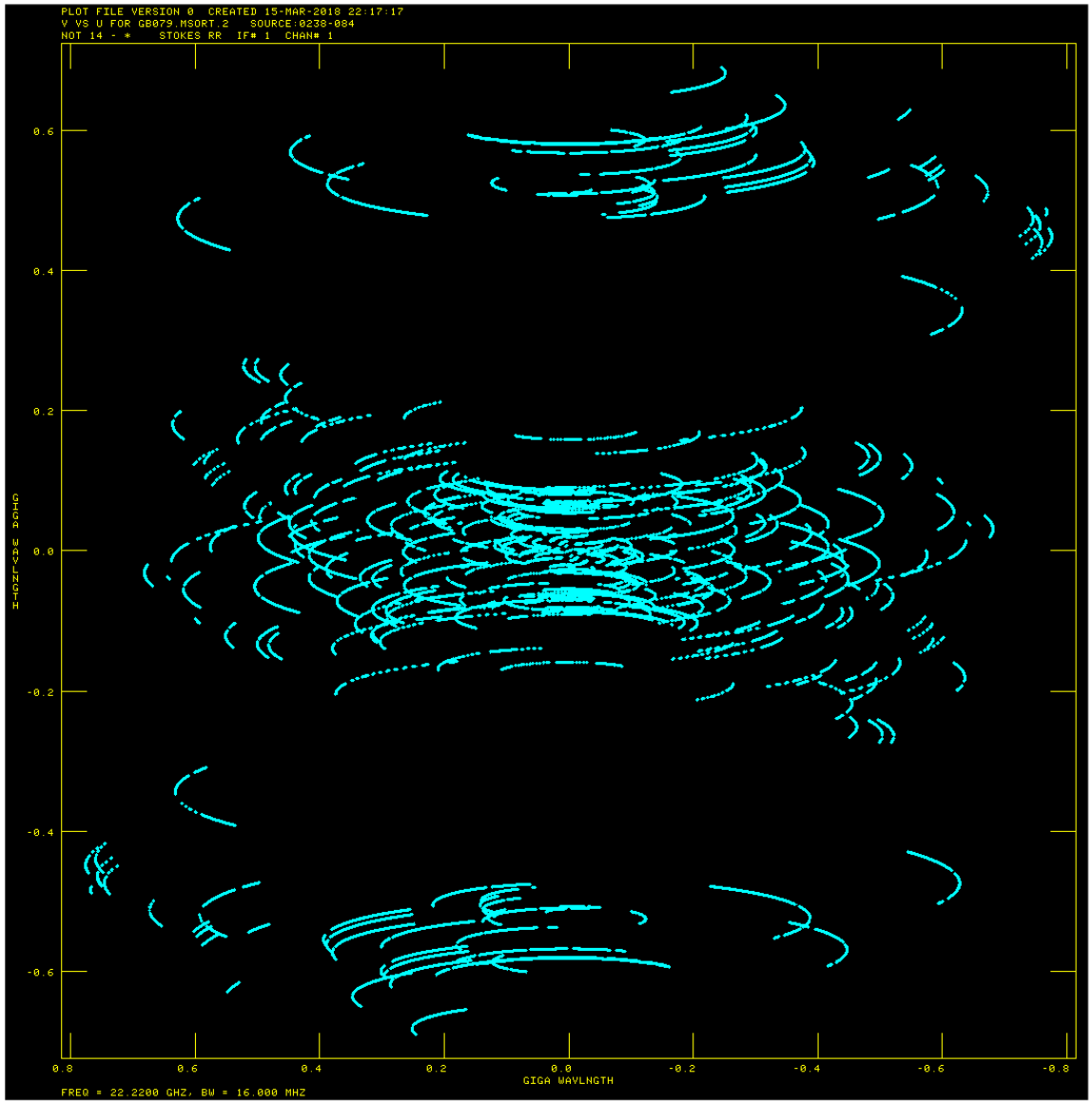
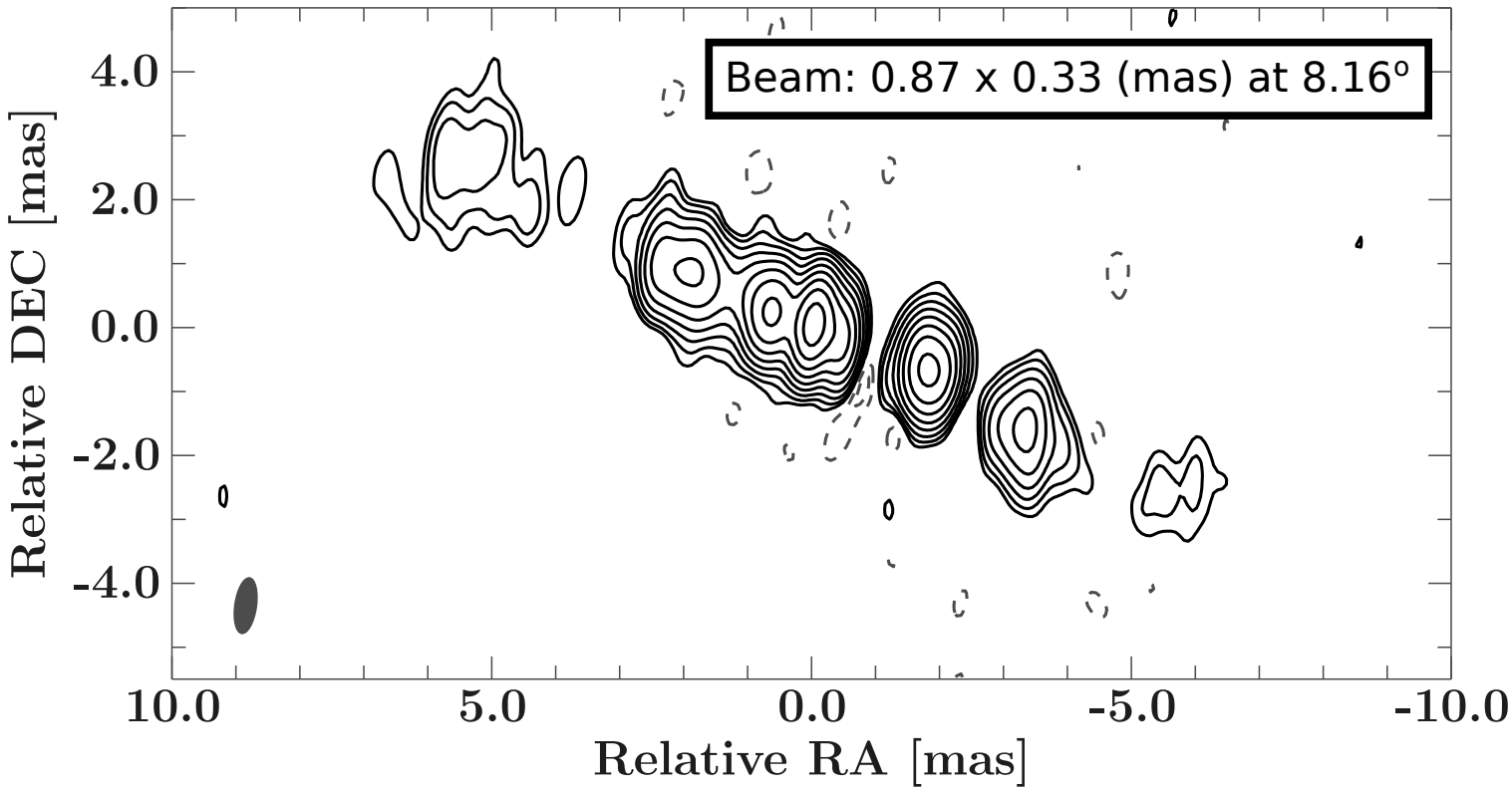
RadioAstron 22 GHz (5.11.2016): Final uv-coverage



RadioAstron 22 GHz (5.11.2016): Ground uv-coverage

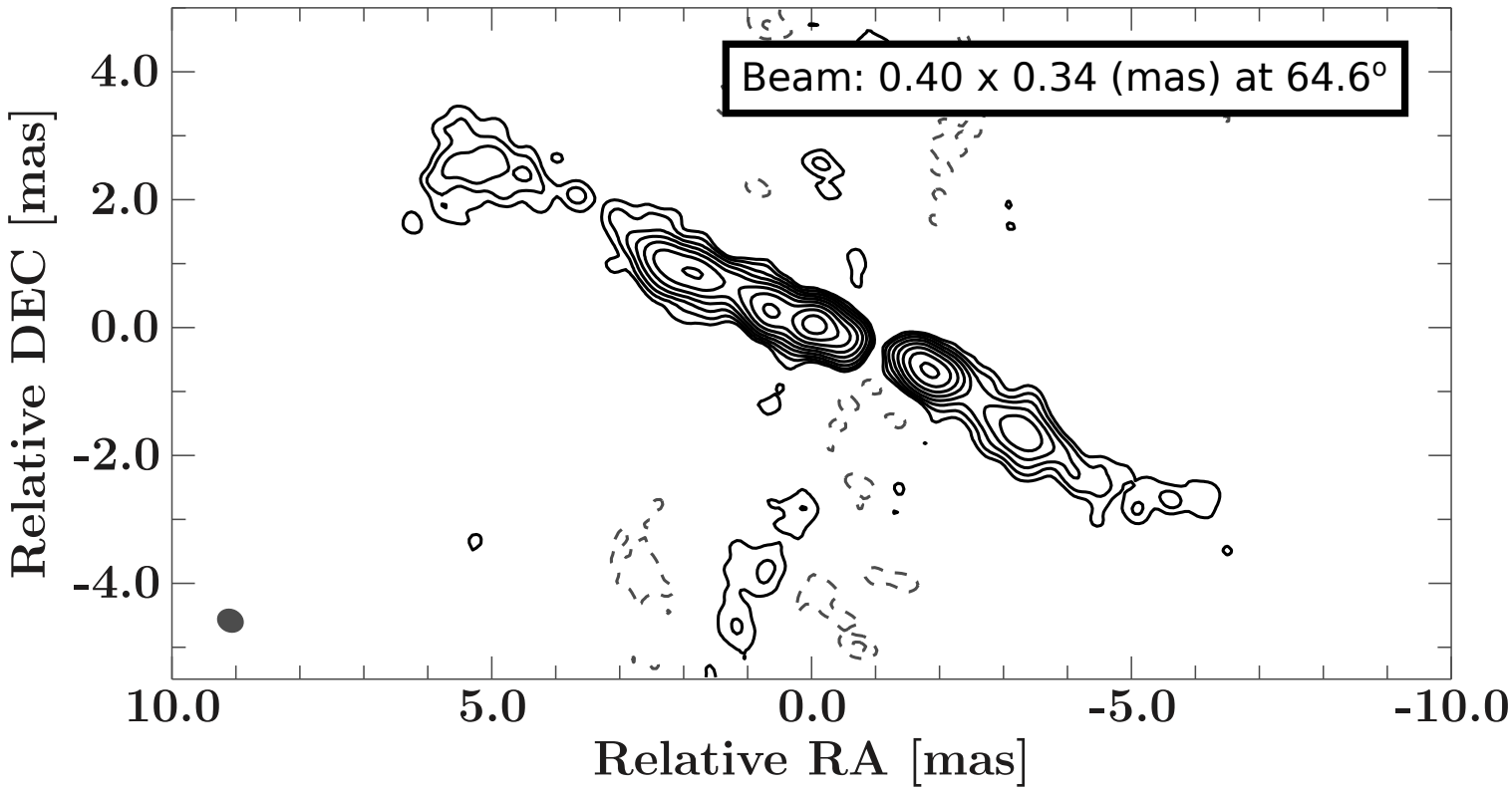


RadioAstron Ground Array: Preliminary 22 GHz images



VLBA MK,KP,OV,LA,BR,PT,NL,HN,SC,FD

RadioAstron Ground Array: Preliminary 22 GHz images



VLBA MK,KP,OV,LA,BR,PT,NL,HN,SC,FD
VLA
EVN EF,SR,MC,MH,ON,HH,KU,BD,SV,UR,YS,ZC
LBA CD,MP,PA,HO,AT

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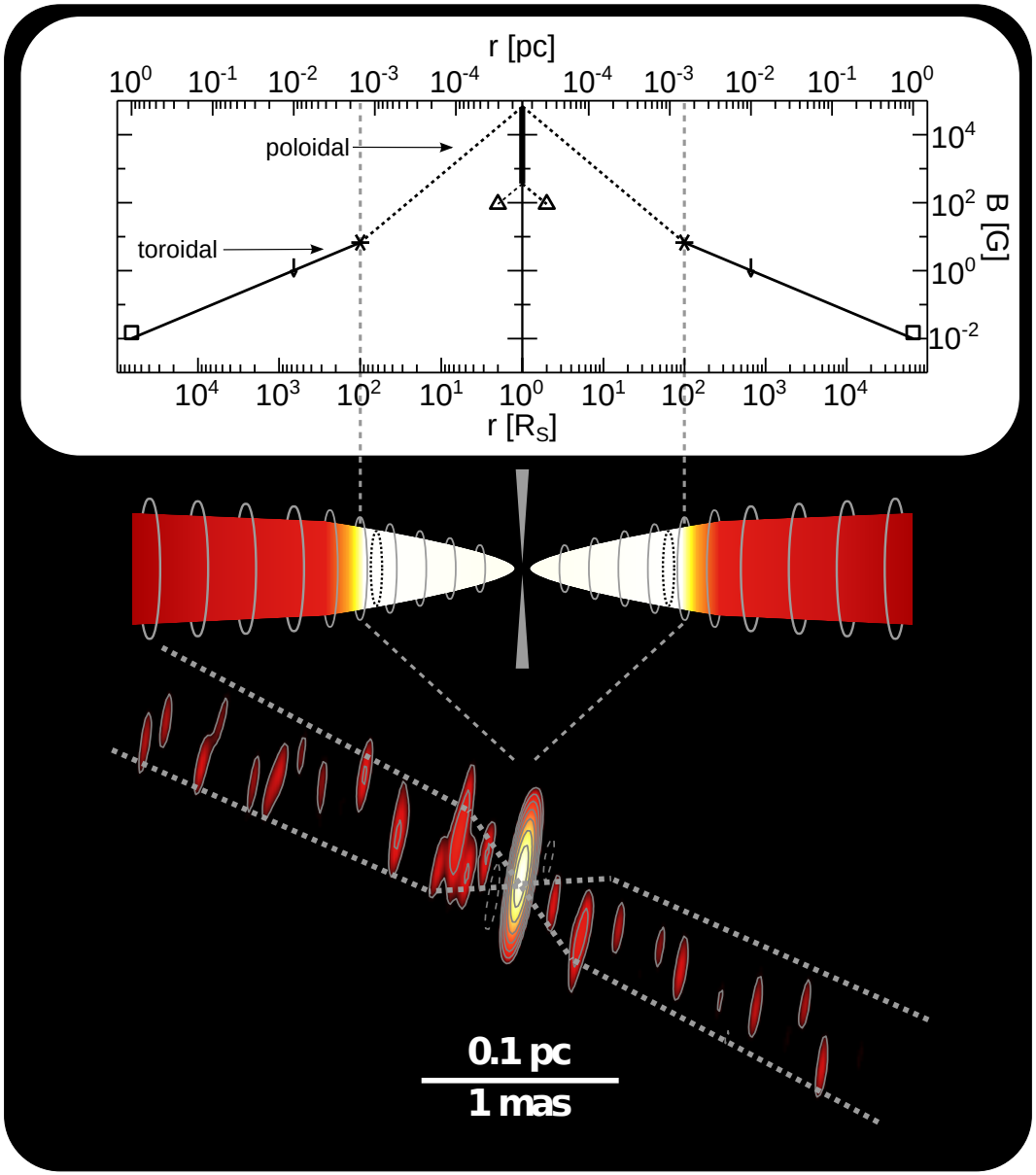
GMVA 2004 results & GMVA 2017 uv-coverage



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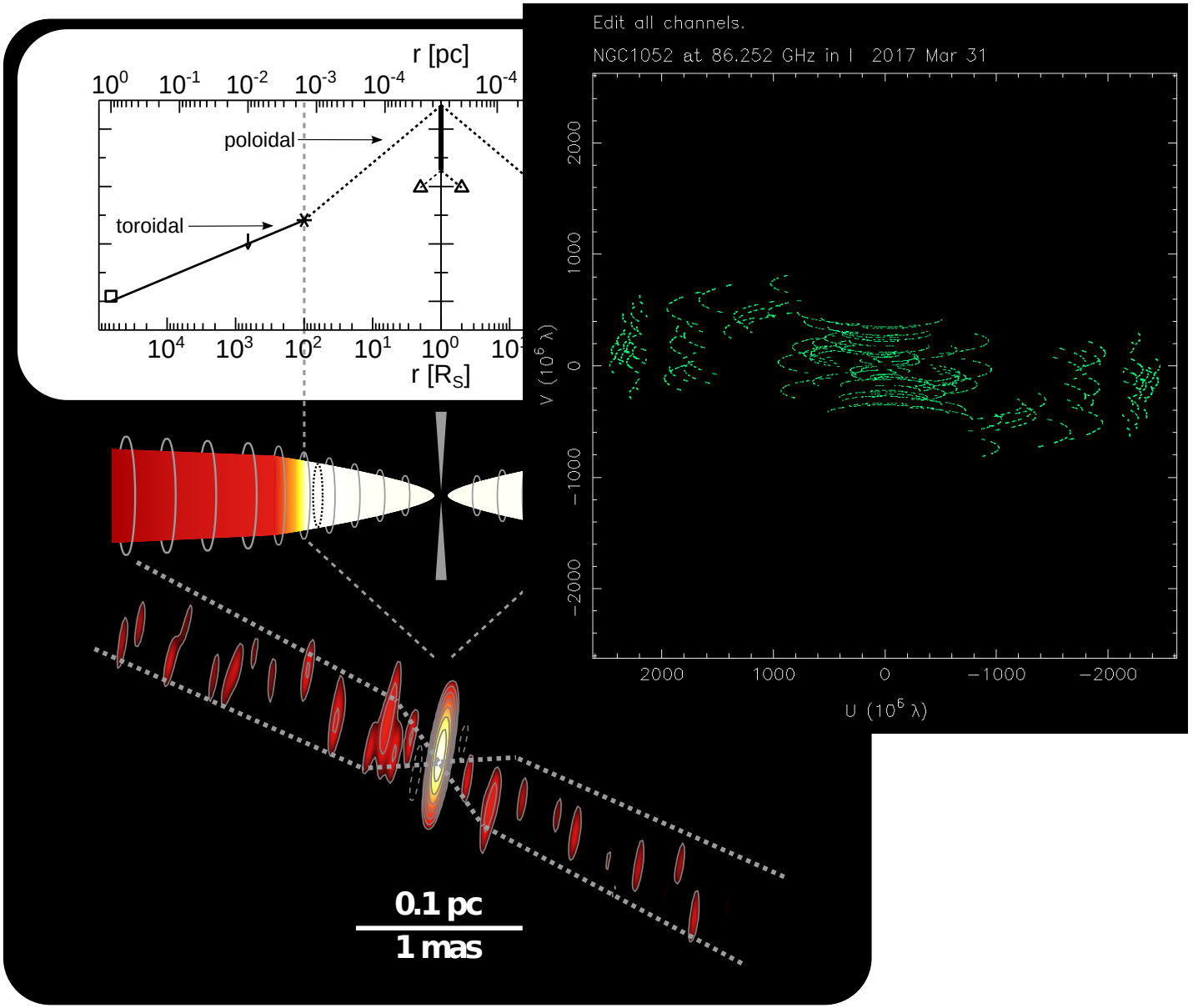

Summary and Outlook

Summary

- Multi-λ VLBA of NGC 1052
- SRHD simulations using EA: slightly OP jet (Fromm+ in prep)
- RadioAstron Ground Array 22 GHz image:
  $\rightarrow$Resolution comparable to 43 GHz VLBA
  $\rightarrow$Jets appear unresolved

In Progress: observations within 2 weeks from VLBA Multi-λ

- GMVA
- EHT (See talk by H. Falcke)