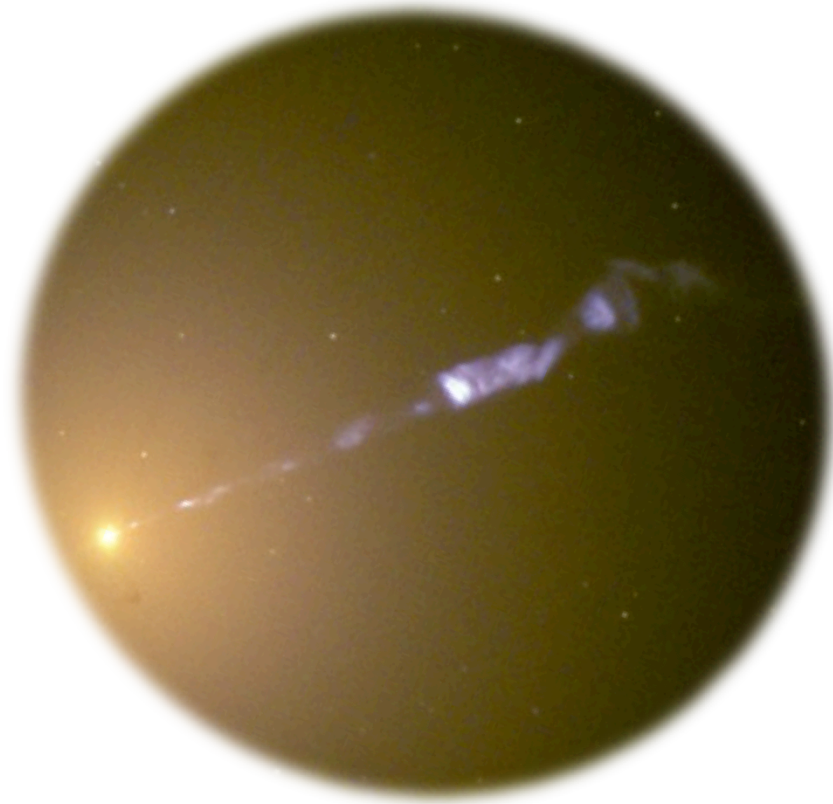


Progress report on KaVA M87 monitor project



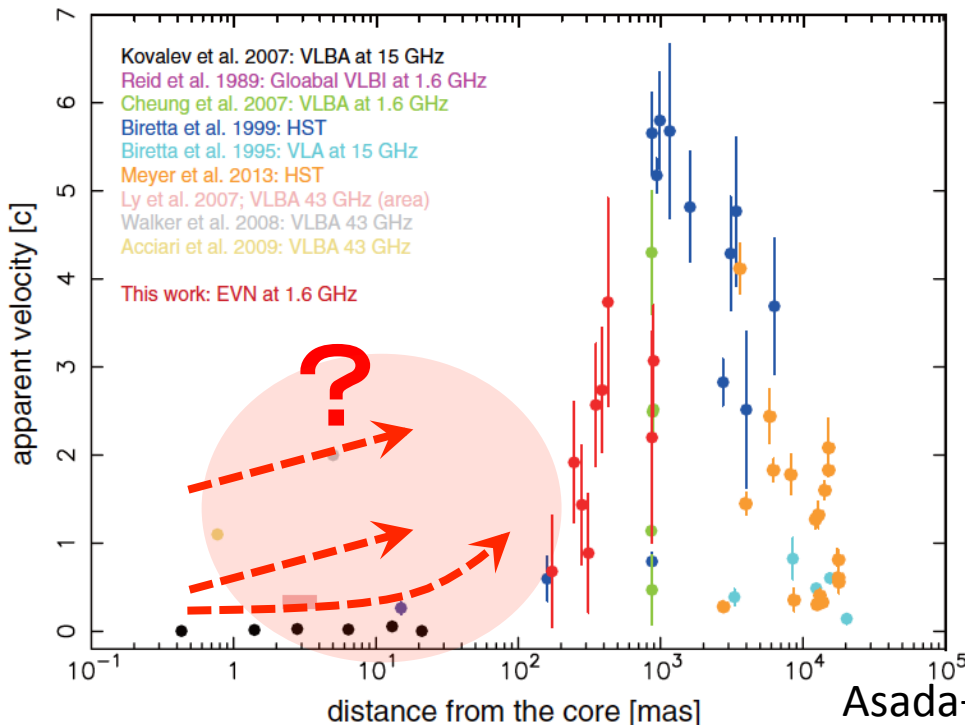
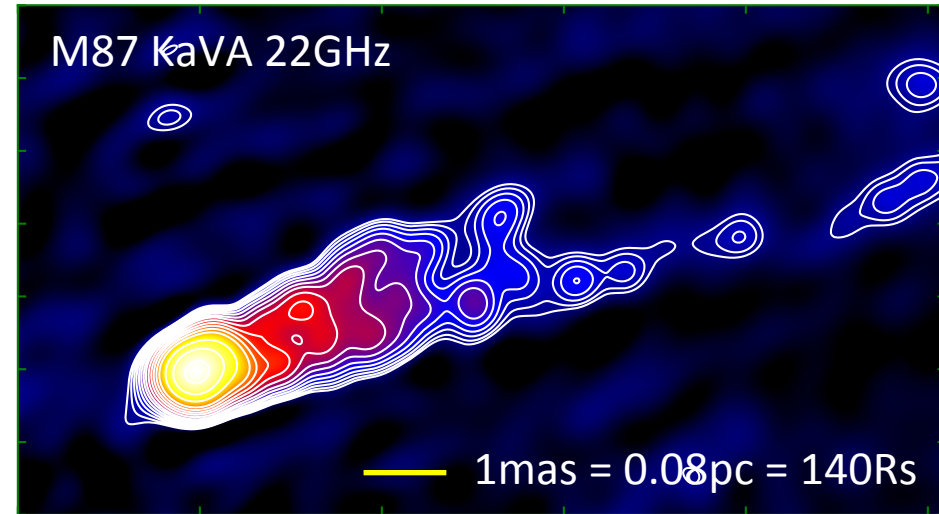
Kazuhiro Hada (NAOJ)

On behalf of KaVA-AGN-subWG

M87 jet base monitor project

Concept

~Biweekly monitoring of M87 jet formation scales at unprecedented image quality (quasi fulltrack, wideband)



Purpose

Velocity field

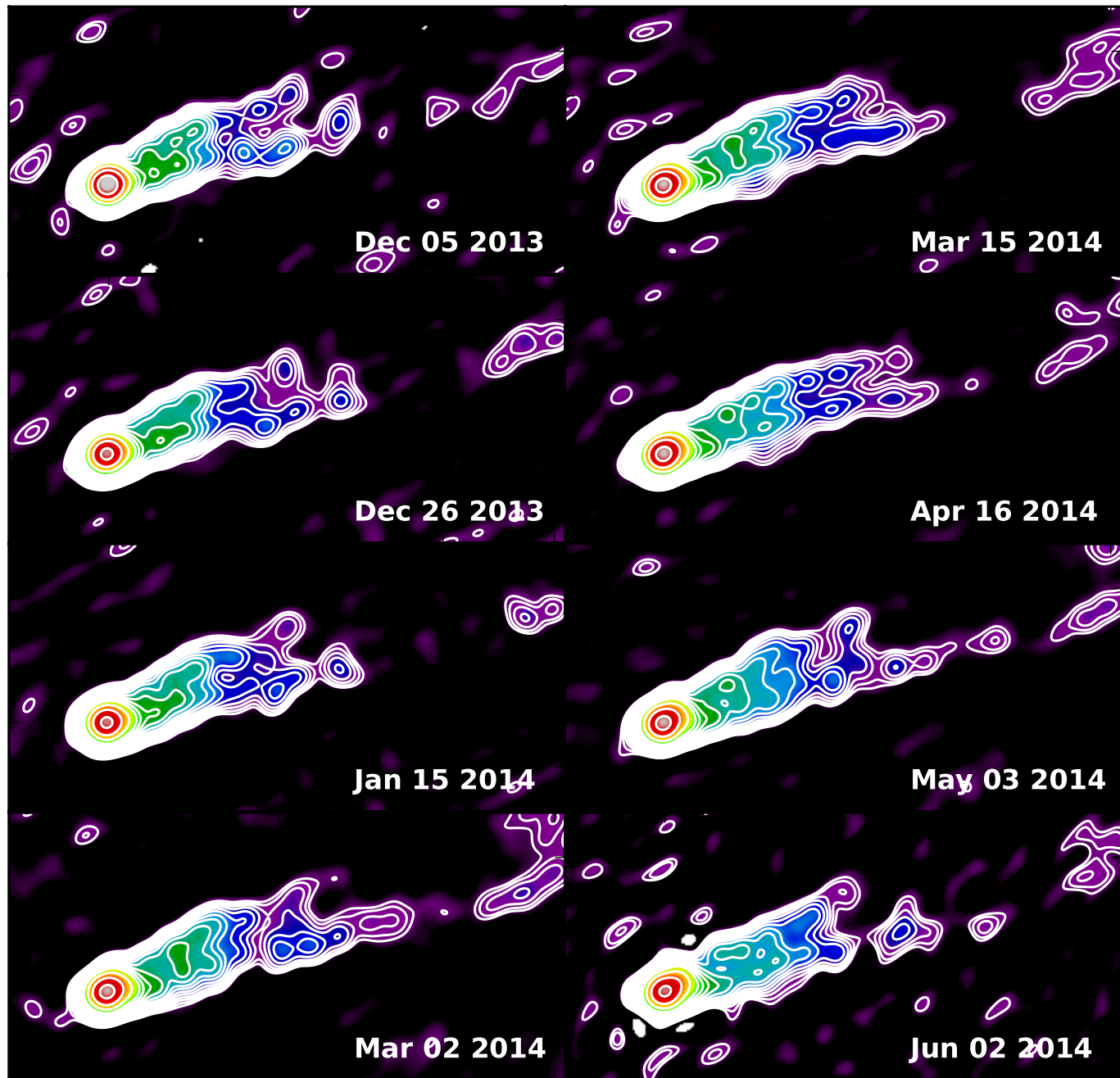
Magnetic acceleration paradigm

Possible connection to collimation profile

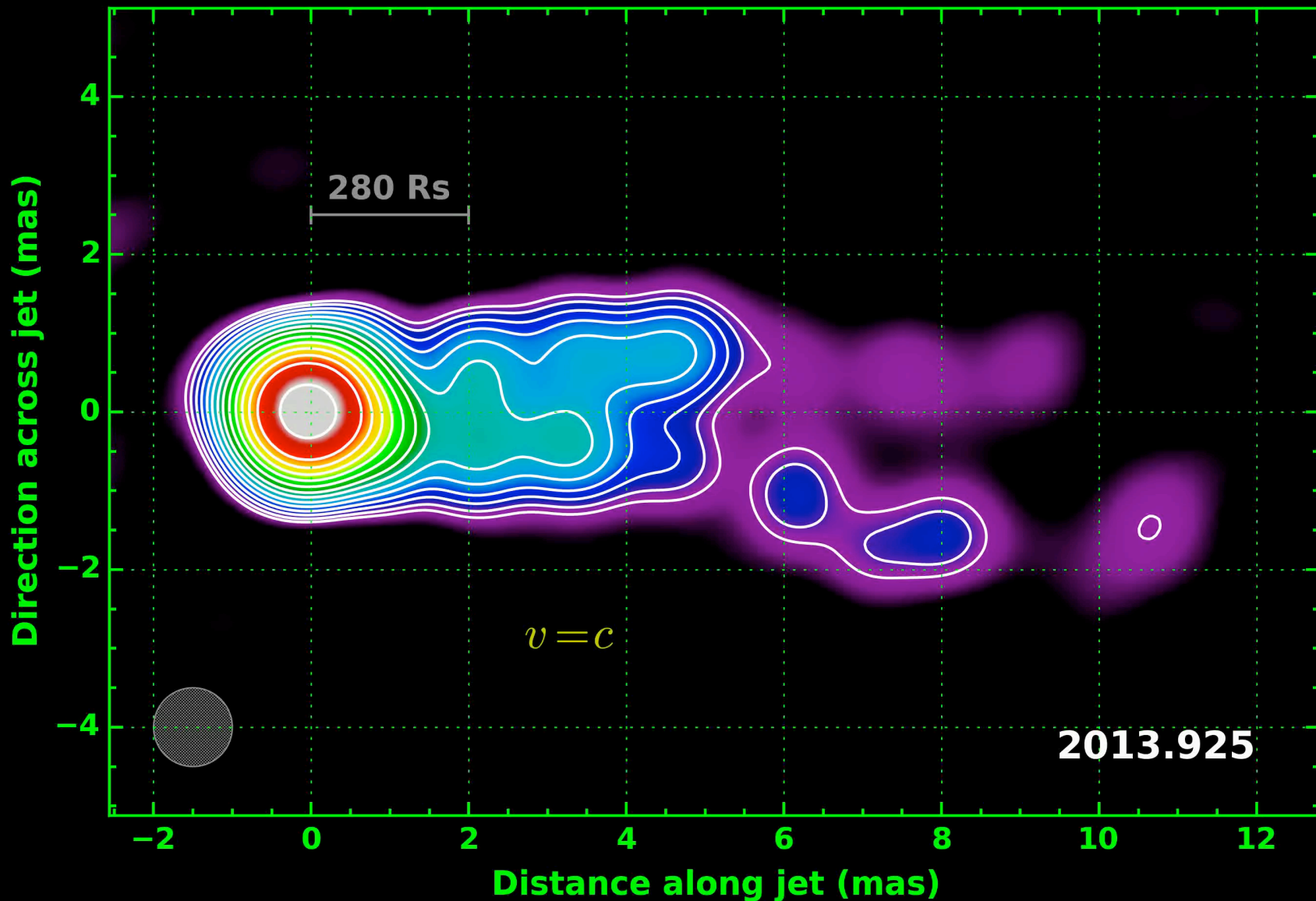
Obs code	yyyy.mm.dd	PI	Freq.	Corr Mode	FITS release
r13254c	2013.09.11	Niinuma	K	VERA7(C5)	○
r13339b	2013.12.05	Niinuma	K	VERA7(C5)	○
r13360a	2013.12.26	Niinuma	K	VERA7(C5)	○
r14015a	2014.01.15	Niinuma	K	GEO1S(C5)	○
r14034b	2014.02.03	Niinuma	K	GEO1S(C5)	○
r14056b	2014.02.25	Niinuma	K	GEO1S(C5)	○
r14061b	2014.03.02	Hada	K	GEO1S(C5)	○
r14074b	2014.03.15	Hada	K	GEO1S(C5)	○
r14093b	2014.04.03	Hada	K	GEO1S(C5)	Waiting
r14106b	2014.04.16	Hada	K	GEO1S(C5)	○
r14123a	2014.05.03	Hada	K	GEO1S(C5)	○
r14135a	2014.05.15	Hada	K	GEO1S(C5)	Waiting
r14153b	2014.06.02	Hada	K	GEO1S(C5)	○
r14165a	2014.06.14	Kino	K	GEO1S(C5)	○
r14244a	2014.09.01	Kino	K	GEO1S(C5)	○
r14257a	2014.09.14	Kino	K	GEO1S(C5)	○
r14308c	2014.11.04	Niinuma	K	GEO1S(C5)	○
r14349b	2014.12.15	Kino	K	VERA4(C4)	○
r15123a	2015.05.03	Kino	K	VERA4(C4)	○
r15124a	2015.05.04	Kino	Q	VERA4(C4)	○
r15136a	2015.05.16	Kino	K	VERA4(C4)	○
r15137b	2015.05.17	Kino	Q	VERA4(C4)	○

22GHz images (2013/Dec – 2014/Jun)

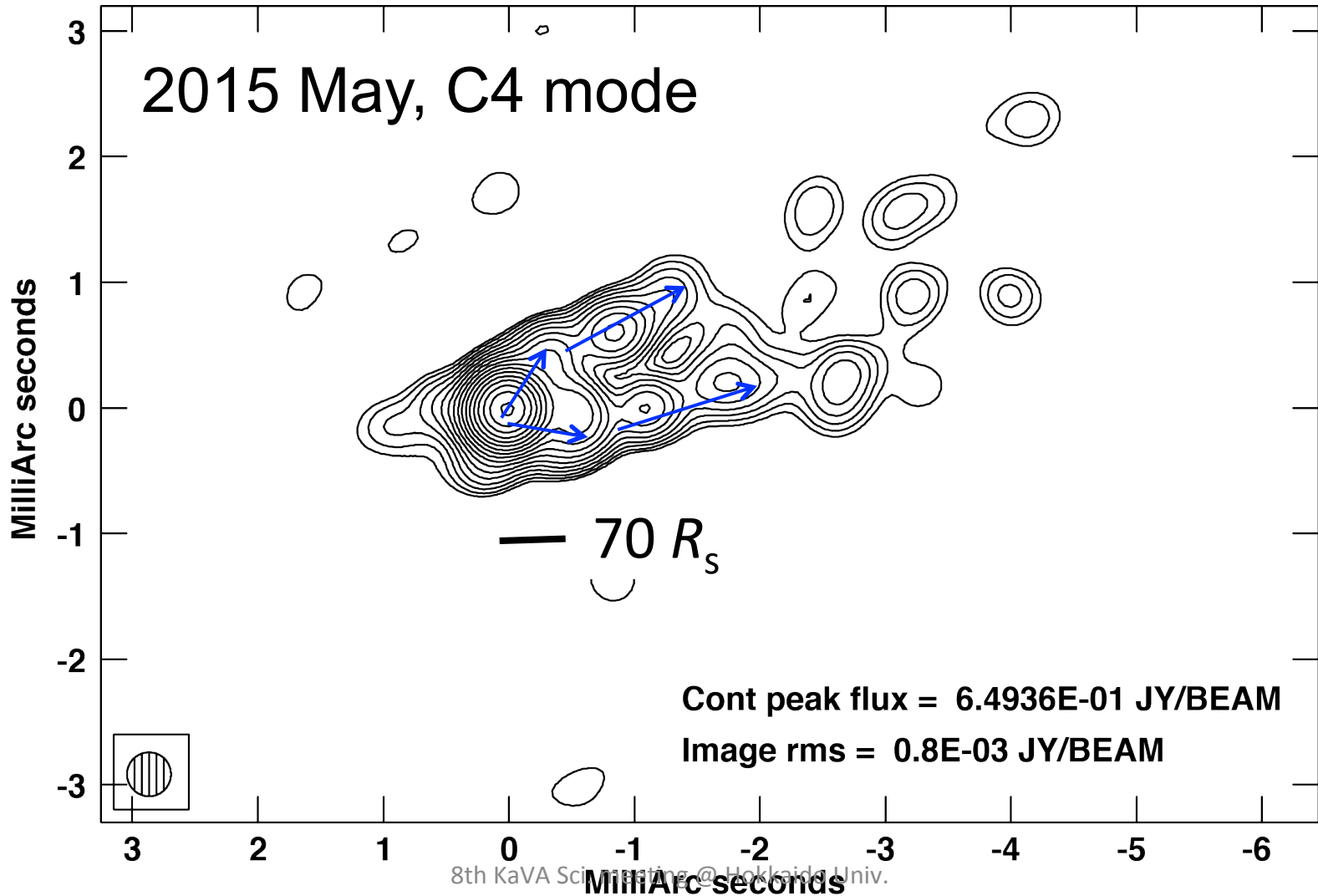
- Rich structure imaged down to ~ 10 mas
- Low-level emission detected another ~ 10 mas down jet
- KaVA possible to study a jet region from $r=200$ to $6000R_s$!



Movie (22GHz, Dec/2013 – Jun/2014, 11epochs)



KaVA 43 GHz image



KaVA large program for M87 monitor: requested proposal

	Total epoch	Interval	1epoch	total
M87 at 22GHz	12	2weeks	7hr	84hr
M87 at 43GHz	9	2weeks	7hr	63hr

From December to May

- Merits of dual-frequency monitoring
 - Consistent detections of identical components at both K/Q can ensure the conclusion
 - Extend the motion-measurable distance: from $<100R_s$ (at Q) down to $\sim 6000R_s$ (at K)

Summary and what's next

- The project going very well:
 - Detailed jet imaging from 200 to 6000Rs (22GHz)
 - Resolved jet collimation scale <100 Rs (43GHz)
 - Unambiguous detection of a fast ($>1c$) jet motion
- Next to do (in progress)
 - Quantify jet motions
 - Multi-epoch analysis, movie at Q-band
 - Velocity profile closer to the jet origin
 - K-Q joint analysis
 - Consistency/discrepancy in proper motion
 - Spectral index and its evolution