

JIVE

VLBI20-30: A scientific roadmap for the next decade

Francisco Colomer

Director, Joint Institute for VLBI ERIC (JIVE)

Thanks to EC H2020 *JUMPING JIVE* project, the European VLBI Network (EVN) has developed a ***scientific roadmap for VLBI in the next decade***, covering the following areas:

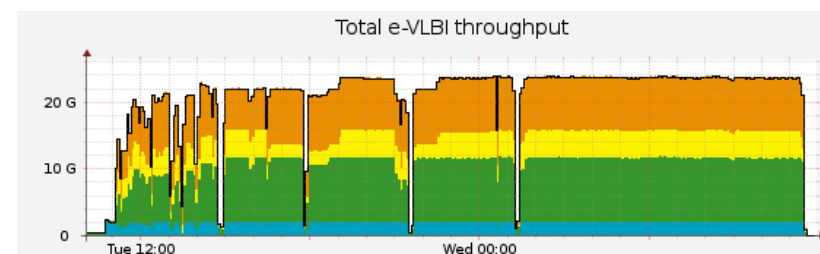
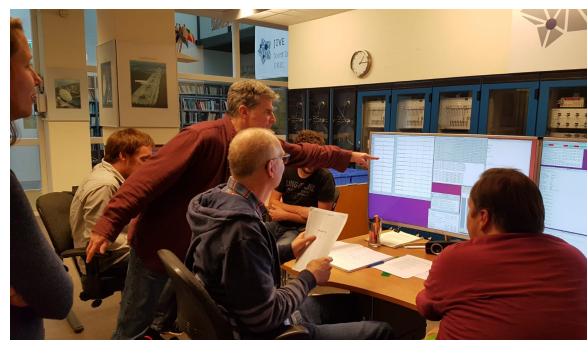
1. *Cosmology*
2. *Galaxy formation and evolution*
3. *Innermost regions of AGN*
4. *Explosive phenomena, transients*
5. *Stars and stellar masers in the Milky Way*
6. *Earth and Space*



Image by Paul Boven (boven@jive.eu). Satellite image: Blue Marble Next Generation, courtesy of Nasa Visible Earth (visibleearth.nasa.gov).

The EVN is a distributed long-baseline radio interferometric array, that operates at the very forefront of astronomical research. Recent results, together with the science possibilities outlined in the 2020-2030 vision document, demonstrate the EVN's potential to generate new and exciting results that will transform our view of the cosmos.

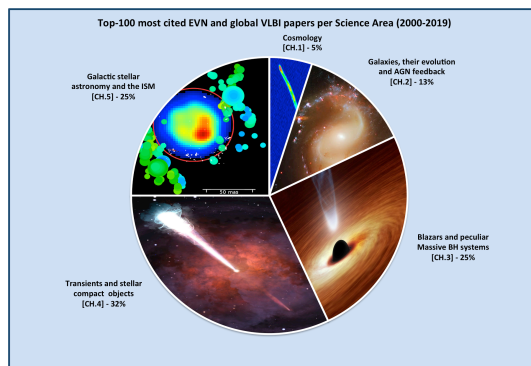
The Joint Institute for VLBI ERIC (JIVE) is the central facility of the EVN, develops and operates the central data processor, supports the EVN operations and EVN users. The EVN is the only VLBI network in the world that operates in real-time (e-EVN) routinely.



The EVN and JIVE maintain fruitful collaboration with other VLBI arrays and facilities across the electromagnetic spectrum. JIVE participates actively in the development of VLBI capabilities for the Square Kilometre Array (SKA-VLBI).

Key science goals for VLBI in the next decade:

- What is the nature of dark matter and dark energy?
- When and how did the first black holes form?
- How do relativistic jets form? What is their impact on the host galaxy?
- What is the physics of explosions following gravitational wave events?
- What are the elusive Fast Radio Bursts?
- Are we alone?
- How was the Milky Way born?
- How do stars form? How do they impact the environment at their death?



Download from:

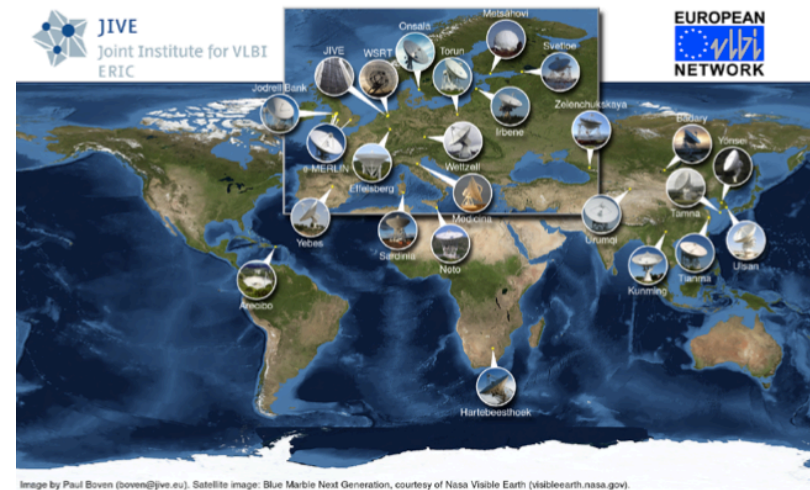
<https://arxiv.org/abs/2007.02347>



VLBI20-30: a scientific roadmap for the next decade

The future of the European VLBI Network

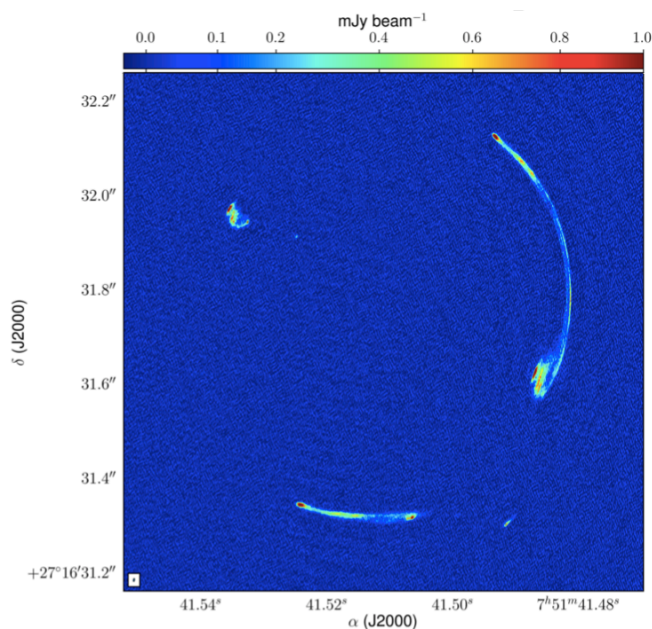
Editors: Tiziana Venturi, Zsolt Paragi & Michael Lindqvist



Endorsed by the EVN Consortium Board of Directors

VLBI provides a unique contribution to astrophysical research.

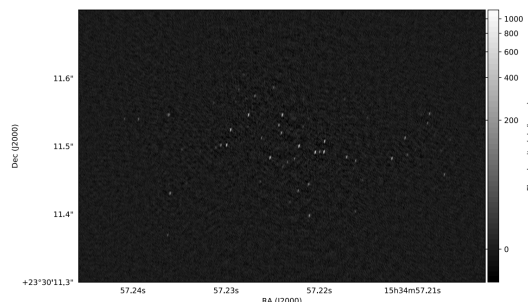
1. Cosmology



<https://www.jive.nl/new-images-super-telescope-bring-astronomers-step-closer-understanding-dark-matter>

<http://www.jive.eu/global-network-radio-telescopes-exposes-aftermath-violent-merger-neutron-stars>

2. Galaxy formation and evolution

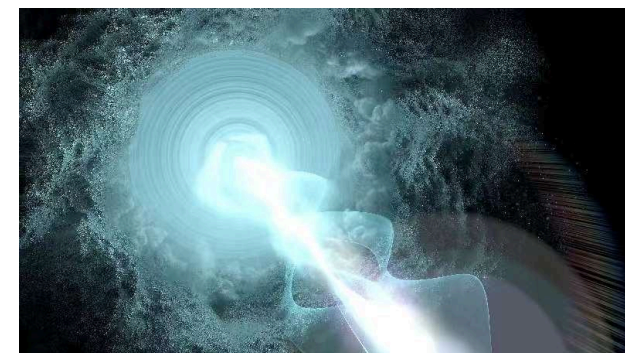


http://www.jive.nl/jivewiki/lib/exe/fetch.php?media=evnnews:evn_newsletter53.pdf



<http://www.jive.eu/astronomers-capture-first-image-black-hole>

3. Innermost regions of AGN

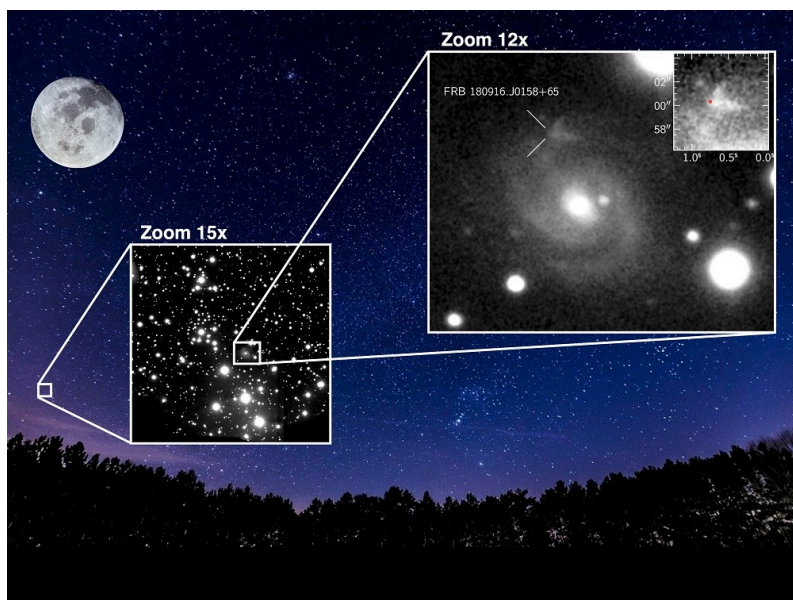


<http://www.jive.eu/observing-most-distant-yet-powerful-engines-universe-helps-astronomers-understand-its-early-formatio>

<http://www.jive.eu/jets-blow-gas-out-galaxy>

VLBI provides a unique contribution to astrophysical research.

4. Explosive phenomena, transients

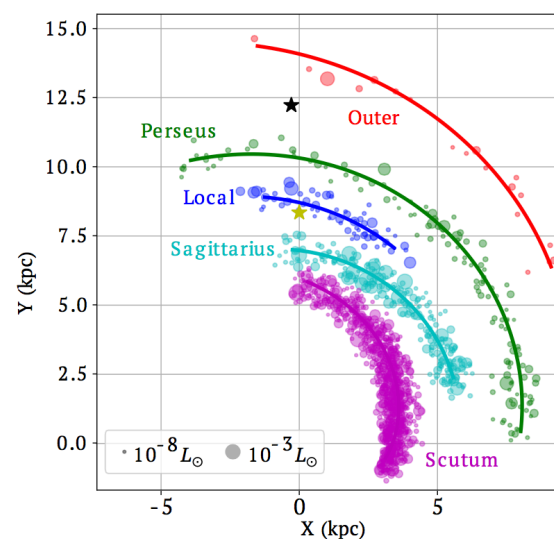


<http://www.jive.eu/repeating-fast-radio-burst-spiral-galaxy-deepens-mystery-where-these-signals-originate>

<http://www.jive.eu/astronomers-observe-%E2%80%98smoking-gun%E2%80%99-orphan-gamma-ray-burst-afterglow>

5. Stars and stellar masers in the Milky Way

<http://www.jive.eu/imaging-water-maser-superburst>

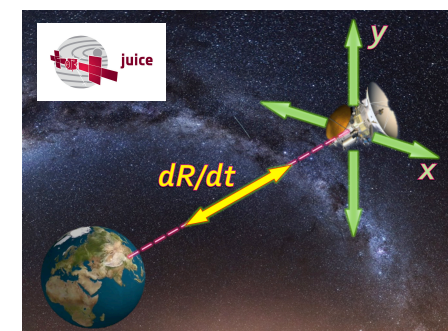


<http://www.jive.eu/astronomers-pinpoint-extreme-binary-system-and-track-its-motion-within-milky-way>

6. Earth and Space

<http://www.jive.eu/celebrating-milestones-space-borne-high-resolution-radio-astronomy>

<http://www.jive.eu/telescopes-space-even-sharper-images-black-holes>



<http://www.jive.eu/pride-chosen-esas-juice-mission>



A **technological roadmap for the EVN and JIVE** is being developed, including the following elements:

- New telescopes
- New broadband and multi-band receivers
- New backends
- Upgraded polarization
- High resolution & wide field VLBI
- New tools for scheduling, monitoring of equipment
- New tools for data analysis (CASA VLBI)
- Protection from Radio Frequency Interference (RFI)

EVN web:

<http://www.evlbi.org/>

EVN/JIVE newsletter:

<https://www.evlbi.org/newsletter>

Social networks:



@jivevlbi / @jivedirector



CRAF
Committee on Radio Astronomy Frequencies

- High data rate fibre connections (> 100 Gbps)
- SKA-VLBI

