CURRÍCULUM VÍTAE NORMALIZADO

Guang-Yao Zhao

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GOBIERNO DE ESPAÑA MINISTERIO DE CIENCIA E INNOVACIÓN

FECYT FUNDACIÓN ESPAÑOLA PARA LA CIENCIA Y LA TECNOLOGÍA

Summary of CV

This section describes briefly a summary of the career in science, academic and research; the main scientific and technological achievements and goals in your line of research in the medium -and long- term. It also includes other important aspects or peculiarities.

I am currently a postdoc funded by the Severo-Ochoa project at the **Instituto de Astrofísica de Andalucía** - **CSIC**. I am also a member and a working group coordinator of the **Event Horizon Telescope Collaboration** (EHTC). My research topic is studying supermassive black holes (SMBHs) and Active Galactic Nuclei (AGNs) with very long baseline interferometry (VLBI), which provides the highest resolution in astronomy as it forms a network of radio telescopes. VLBI is ideal for studying compact objects like SMBHs, and astrophysical jets launched from the vicinity of black holes.

Research trajectory

My doctoral degree thesis topic was to study the spectral and kinematics of AGN jets using multi-frequency, multi-epoch VLBI observations. After obtaining my doctoral degree, I conducted postdoctoral research activities with the Korean VLBI Network (KVN). The KVN is a dedicated millimeter-VLBI facility. Compared with conventional VLBI (mostly at centimeter wavelengths), mm-VLBI holds the potential of probing closure to the central black hole, offering even higher resolution and facing new challenges. We established several more unique features for the KVN, which could benefit the future global mm-VLBI array.

During 2016-2019, I was granted a **KRF-fellowship** funded by the NRF, Korea. I further developed the calibration methods of multi-frequency VLBI data. With the new approach, the coherence time in the data could be extended by several orders of magnitudes and thus significantly improve the sensitivity of the array. Based on the promising results of the new method, we carried out several R&D projects. These include 1) establishing a catalog of mm-VLBI sources with MASK (Multi-frequency AGN Survey with KVN); 2) expanding the KVN into a global simultaneous multi-frequency array. We have detected more than twice the number of sources achieved by the other VLBI arrays with MASK. For the second project, one of the global partners implementing KVN-compatible systems is the Yebes 40-meter telescope in Spain. We achieved successful test observations between KVN and Yebes in 2018.

Since 2017, I have become a member of the EHT collaboration. EHT is a global network of mm-VLBI facilities working at the highest frequencies of VLBI (including one station located in Granada, Spain). In April 2019, we released human kinds' **first images of a black hole**. The picture shows a bright ring formed as light bends in the intense gravity around a black hole that is 6.5 billion times more massive than the Sun. This long-sought image provides the most substantial evidence to date for the existence of supermassive black holes. It opens a new window onto the study of black holes, their event horizons, and gravity. The scientific community and the public have well recognized the EHT result. The image was viewed

~4.5 billion times. The EHT collaboration was also awarded the **breakthrough prize for Fundamental physics 2020**.

Summary of Research activities

Publications:
As of March 2022, I have published 61 research papers cited 2785 times in total.
My current h-index is 19 (reference: Scopus).

Conference presentations:
I have given 30 presentations in international conferences, including 9 invited and solicited talks, 15 contributed talks, and 6 posters;

Teaching experience:
I have co-tutored one doctoral degree thesis (Ilje Cho, 2020) and one master's thesis (Jeonguk Kim, 2019). I am currently co-tutoring two JAE-Intro fellowship students on their masters' degree thesis.

List of Awards and Fellowships

2021, Group Award (A) of the Royal Astronomical Society, UK (as a member of the EHT collaboration)
2020, Nelson P. Jackson Aerospace Award (as a member of the EHT collaboration)
2020, Bruno Rossi Prize (as a member of the EHT collaboration)
2020, **Einstein Medal** (as a member of the EHT collaboration)
2020, **Breakthrough Prize in Fundamental Physics** (as a member of the EHT collaboration)
2019, Diamond Achievement Award of the US National Science Foundation (as a member of the EHT collaboration)
2019, **Chief Director Prize of NST Korea** (as a member of the EHT-Korea team)
2017, Outstanding project award in the KRF annual evaluation
2016-2019, Korea Research Fellowship
2009, President Award of Shanghai Astronomical Observatory
2006, Award for outstanding association leaders

General quality indicators of scientific research

This section describes briefly the main quality indicators of scientific production (periods of research activity, experience in supervising doctoral theses, total citations, articles in journals of the first quartile, H index...). It also includes other important aspects or peculiarities.

Total number of publications: 61;
Total number of citations: 2785;
Average number of citations per year during postdoctoral period: 298
h-index: 19;
(reference: Scopus; March 2022; https://www.scopus.com/authid/detail.uri?authorId=55478882500)

Awards & Fellowships:

2021, Group Award (A) of the Royal Astronomical Society, UK (as a member of the EHT collaboration)
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2020, Bruno Rossi Prize (as a member of the EHT collaboration)
2020, Einstein Medal (as a member of the EHT collaboration)
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2019, Diamond Achievement Award of the US National Science Foundation (as a member of the EHT collaboration)
2019, Chief Director Prize of NST Korea (as a member of the EHT-Korea team)
2017, Outstanding project award in the KRF annual evaluation
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2009, President Award of Shanghai Astronomical Observatory
2006, Award for outstanding association leaders

Guang-Yao Zhao

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ResearcherID:	**AAA-7324-2019**
Date of birth:	**19/11/1985**
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Nationality:	**China**
Country of birth:	**China**
Contact province:	**Granada**
City of birth:	**Boxing, Shandong province**
Contact address:	**Instituto de Astrofísica de Andalucía, Glorieta de la Astronomía s/n**
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Current professional situation

Employing entity: Instituto de Astrofísica de Andalucía
Department: Radioastronomy and galactic structure department, Institute
Professional category: post-doctoral fellow
City employing entity: Granada, Andalusia, Spain
Start date: 01/12/2019
Type of contract: Temporary employment contract **Dedication regime:** Full time
Primary (UNESCO code): 210501 - Antennae; 210502 - Radio-telescopes; 210599 - Other
Performed tasks: Image reconstruction of the Event Horizon Telescope observations of Black Holes; mm-VLBI observations of Active Galactic Nuclei Development of the next-generation EHT
Identify key words: Black holes; Galactic structure; Active galactic nucleus; Plasma astrophysics; Data analysis methods; Instrumentations and detectors for experiments in physics, astrophysics, etc

Previous positions and activities

	Employing entity	Professional category	Start date
1	Korea Astronomy and Space Science Institute	Korea Research Fellow	01/01/2016
2	Korea Astronomy and Space Science Institute	post-doctoral fellow	01/09/2013

1 **Employing entity:** Korea Astronomy and Space Science Institute **Type of entity:** R&D Centre
Department: Radio Astronomy Division, Institute
City employing entity: Daejeon, Republic of Korea
Professional category: Korea Research Fellow **Educational Management (Yes/No):** No
Start-End date: 01/01/2016 - 30/11/2019 **Duration:** 3 years - 11 months
Type of contract: Temporary employment contract
Performed tasks: Multi-frequency AGN survey with KVN Establishing a global astrometric mm-VLBI network with simultaneous multi-frequency receiving
Identify key words: Black holes; Active galactic nucleus; Data analysis methods; Instrumentations and detectors for experiments in physics, astrophysics, etc
Field of management activity: Public Research Body
Applicability in teaching and/or research: Tutored 1 master-degree student: J, Kim (graduated in 2019); co-supervised 1 PhD student: I, Cho (graduated in 2019); > 20 publications in SCI journals Awarded Breakthrough Prize for Fundamental Physics 2020 (as a member of the Event Horizon Telescope Collaboration)

2 **Employing entity:** Korea Astronomy and Space Science Institute **Type of entity:** R&D Centre
Department: Radio Astronomy Division, Institute
City employing entity: Daejeon, Republic of Korea
Professional category: post-doctoral fellow **Educational Management (Yes/No):** No
Start-End date: 01/09/2013 - 31/12/2015 **Duration:** 2 years - 4 months
Type of contract: Temporary employment contract
Performed tasks: Source-frequency phase-referencing observations observation of AGN jets using KVN
Identify key words: Black holes; Active galactic nucleus
Field of management activity: Public Research Body

Education

University education

1st and 2nd cycle studies and pre-Bologna degrees

University degree: Higher degree
Name of qualification: Bachelor of Natural Science
City degree awarding entity: Jinan, China
Degree awarding entity: Shandong University **Type of entity:** University
Date of qualification: 01/07/2007

Doctorates

Doctorate programme: Doctor of Natural Science
Degree awarding entity: University of Chinese Academy of Sciences **Type of entity:** University
Date of degree: 07/07/2013

Teaching experience

Experience supervising doctoral thesis and/or final year projects

1 **Project title:** VLBI studies of Sagittarius A* at centimeter-millimeter wavelengths (co-supervised with Dr. T. Jung)
Type of project: Doctoral thesis
Entity: Korea Astronomy and Space Science Institute **Type of entity:** R&D Centre
City of entity: Daejeon, Republic of Korea
Student: Ilje Cho
Identify key words: Radio source (astronomy); Black holes; Active galactic nucleus
Date of reading: 04/12/2020

2 **Project title:** Periodic Variation in the Inner Jet Direction of 3C 66A (co-supervised with Dr. B.W. Sohn & Prof. S.-J. Yoon)
Type of project: Master Thesis
Co-director of thesis: Seok-Jin Yoon; Bong Won Sohn
Entity: Yonsei University **Type of entity:** University
City of entity: Seoul, Republic of Korea
Student: Jeonguk Kim
Obtained qualification: Master's degree
Identify key words: Black holes; Active galactic nucleus
Date of reading: 01/06/2019
European doctorate: No

Scientific and technological experience

Scientific or technological activities

R&D projects funded through competitive calls of public or private entities

1 **Name of the project:** Supermassive black holes and relativistic jets at the highest resolution
Type of project: Basic research (including archaeological digs, etc) **Geographical area:** National
Degree of contribution: Researcher
Entity where project took place: Instituto de Astrofísica de Andalucía **Type of entity:** State agency
City of entity: Granada, Andalusia, Spain
Name principal investigator (PI, Co-PI....): José Luis Gómez Fernández
Nº of researchers: 16
Funding entity or bodies:
Ministerio de Ciencia e Innovación **Type of entity:** Government ministry

Type of participation: Team member
Code according to the funding entity: PID2019-108995GB-C21
Start-End date: 01/06/2020 - 31/05/2023 **Duration:** 3 years
Total amount: 223.850 €

2 **Name of the project:** Supermassive black holes and blazar jets
Type of project: Basic research (including archaeological digs, etc) **Geographical area:** Regional
Degree of contribution: Researcher
Entity where project took place: Instituto de Astrofísica de Andalucía **Type of entity:** State agency
City of entity: Granada, Andalusia, Spain
Name principal investigator (PI, Co-PI....): José Luis Gómez Fernández
Nº of researchers: 16
Funding entity or bodies:
Junta de Andalucía **Type of entity:** regional government

Type of participation: Team member
Code according to the funding entity: P18-FR-1769
Start-End date: 01/01/2020 - 31/12/2022 **Duration:** 3 years
Total amount: 139.625 €

3 **Name of the project:** Launching and evolution of AGN jets
Degree of contribution: Researcher
Entity where project took place: Korea Astronomy and Space Science Institute **Type of entity:** Public Research Body
City of entity: Daejeon, Republic of Korea
Name principal investigator (PI, Co-PI....): Bong Won Sohn; Taehyun Jung; Guang-Yao Zhao; Member
Nº of researchers: 15
Funding entity or bodies:

Ministry of Science, Technology, and ICT, Korea **Type of entity:** Public Research Body
City funding entity: Seoul, Republic of Korea

Type of participation: Team member
Start-End date: 01/01/2016 - 31/12/2019 **Duration:** 4 years
Total amount: 850.000 €
Dedication regime: Full time

4 **Name of the project:** Multi-frequency VLBI studies of AGN jets (KRF-fellowship grant)
Identify key words: Black holes; Active galactic nucleus; Data analysis methods; Instrumentations and detectors for experiments in physics, astrophysics, etc
Type of project: Basic research (including archaeological digs, etc) **Geographical area:** Non EU International
Degree of contribution: Researcher
Entity where project took place: Korea Astronomy and Space Science Institute **Type of entity:** Public Research Body
City of entity: Daejeon, Republic of Korea
Name principal investigator (PI, Co-PI....): Taehyun Jung; Guang-Yao Zhao
Nº of researchers: 2
Funding entity or bodies:
National Research Foundation of Korea **Type of entity:** Foundation
City funding entity: Seoul, Republic of Korea

Type of participation: Team member
Name of the programme: Korea Research Fellowship Program
Code according to the funding entity: NRF-2015H1D3A1066561
Start-End date: 01/01/2016 - 30/11/2019 **Duration:** 3 years - 11 months
Total amount: 200.000 €
Dedication regime: Full time

5 **Name of the project:** Core-shift in AGN jets
Identify key words: Active galactic nucleus; Instrumentations and detectors for experiments in physics, astrophysics, etc
Degree of contribution: Researcher
Entity where project took place: Korea Astronomy and Space Science Institute **Type of entity:** Public Research Body
City of entity: Daejeon, Republic of Korea
Name principal investigator (PI, Co-PI....): Taehyun Jung; Bong Won Sohn; Guang-Yao Zhao; Maria Rioja; Richard Dodson; Member
Nº of researchers: 15
Type of participation: Team member
Start-End date: 01/01/2015 - 31/12/2015 **Duration:** 1 year
Total amount: 100.000 €
Dedication regime: Full time

Scientific and technological activities

Scientific production

Publications, scientific and technical documents

1 R. Lico; C. Casadio; S.G. Jorstad; ...; G.-Y. Zhao; .... New jet feature in the parsec-scale jet of the blazar OJ 287 connected to the 2017 teraelectronvolt flaring activity. Astronomy and Astrophysics. 658, 2022.
Type of production: Scientific paper **Format:** Journal

2 J.L. Gómez; E. Traianou; T.P. Krichbaum; ...; G.-Y. Zhao; .... Probing the Innermost Regions of AGN Jets and Their Magnetic Fields with RadioAstron. V. Space and Ground Millimeter-VLBI Imaging of OJ 287. Astrophysical Journal. 924 - 2, 2022.
Type of production: Scientific paper **Format:** Journal

3 Ilje Cho; Guang-Yao Zhao; Tomohisa Kawashima; .... The Intrinsic Structure of Sagittarius A* at 1.3 cm and 7 mm. The Astrophysical Journal. 2022. Available on-line at: <http://doi.org/10.3847/1538-4357/ac4165>.
Type of production: Scientific paper **Format:** Journal
Corresponding author: Yes

4 K. Satapathy; D. Psaltis; F. ⁄-zel; ...; G.-Y. Zhao; S.-S. Zhao. The Variability of the Black Hole Image in M87 at the Dynamical Timescale. Astrophysical Journal. 925 - 1, 2022.
Type of production: Scientific paper **Format:** Journal

5 J.C. Algaba; J. Anczarski; K. Asada; ...; G.-Y. Zhao; .... Broadband Multi-wavelength Properties of M87 during the 2017 Event Horizon Telescope Campaign. Astrophysical Journal Letters. 911 - 1, 2021.
Type of production: Scientific paper **Format:** Journal

6 P. Kocherlakota; L. Rezzolla; H. Falcke; ...; G.-Y. Zhao; S.-S. Zhao. Constraints on black-hole charges with the 2017 EHT observations of M87*. Physical Review D. 103 - 10, 2021.
Type of production: Scientific paper **Format:** Journal

7 Y.-Z. Cui; K. Hada; M. Kino; ...; G.-Y. Zhao; .... East Asian VLBI Network observations of active galactic nuclei jets: Imaging with KaVA+Tianma+Nanshan. Research in Astronomy and Astrophysics. 21 - 8, 2021.
Type of production: Scientific paper **Format:** Journal

8 M. Janssen; H. Falcke; M. Kadler; ...; G.-Y. Zhao; S.-S. Zhao. Event Horizon Telescope observations of the jet launching and collimation in Centaurus A. Nature Astronomy. 5 - 10, pp. 1017 - 1028. 2021.
Type of production: Scientific paper **Format:** Journal

9 K. Akiyama; J.C. Algaba; A. Alberdi; ...; G.-Y. Zhao; S.-S. Zhao. First M87 Event Horizon Telescope Results. VII. Polarization of the Ring. Astrophysical Journal Letters. 910 - 1, 2021.
Type of production: Scientific paper **Format:** Journal

10 K. Akiyama; J.C. Algaba; A. Alberdi; ...; G.-Y. Zhao; S.-S. Zhao. First M87 Event Horizon Telescope Results. VIII. Magnetic Field Structure near the Event Horizon. Astrophysical Journal Letters. 910 - 1, 2021.
Type of production: Scientific paper **Format:** Journal

11 J. Park; K. Hada; M. Nakamura; K. Asada; G. Zhao; M. Kino. Jet Collimation and Acceleration in the Giant Radio Galaxy NGC 315. Astrophysical Journal. 909 - 1, 2021.
Type of production: Scientific paper **Format:** Journal

12 C. Goddi; I. Martí-Vidal; H. Messias; ...; G.-Y. Zhao; .... Polarimetric Properties of Event Horizon Telescope Targets from ALMA. Astrophysical Journal Letters. 910 - 1, 2021.
Type of production: Scientific paper **Format:** Journal

13 R. Narayan; D.C.M. Palumbo; M.D. Johnson; ...; G.-Y. Zhao; S.-S. Zhao. The Polarized Image of a Synchrotron-emitting Ring of Gas Orbiting a Black Hole. Astrophysical Journal. 912 - 1, 2021.
Type of production: Scientific paper **Format:** Journal

14 J.-Y. Kim; T.P. Krichbaum; A.E. Broderick; ...; G. Zhao; .... Event Horizon Telescope imaging of the archetypal blazar 3C 279 at an extreme 20 microarcsecond resolution. Astronomy and Astrophysics. 640, 2020.
Type of production: Scientific paper **Format:** Journal

15 M. Wielgus; K. Akiyama; L. Blackburn; ...; G. Zhao; .... Monitoring the Morphology of M87* in 2009-2017 with the Event Horizon Telescope. Astrophysical Journal. 901 - 1, 2020.
Type of production: Scientific paper **Format:** Journal

16 F. Roelofs; M. Janssen; I. Natarajan; ...; G. Zhao; .... SYMBA: An end-to-end VLBI synthetic data generation pipeline: Simulating Event Horizon Telescope observations of M 87. Astronomy and Astrophysics. 636, 2020.
Type of production: Scientific paper **Format:** Journal

17 A.E. Broderick; R. Gold; M. Karami; ...; G. Zhao; .... THEMIS: A Parameter Estimation Framework for the Event Horizon Telescope. Astrophysical Journal. 897 - 2, 2020.
Type of production: Scientific paper **Format:** Journal

18 R. Eatough; R. Gold; A.E. Broderick; ...; G. Zhao; .... Verification of Radiative Transfer Schemes for the EHT. Astrophysical Journal. 897 - 2, 2020.
Type of production: Scientific paper **Format:** Journal

19 J. Park; S.-S. Lee; J.-Y. Kim; ...; G.-Y. Zhao; .... Ejection of Double Knots from the Radio Core of PKS 1510-089 during the Strong Gamma-Ray Flares in 2015. Astrophysical Journal. 877 - 2, 2019.
Type of production: Scientific paper **Format:** Journal

20 T. Event Horizon Telescope Collaboration; ...; G. Zhao; .... First M87 Event Horizon Telescope Results. I. the Shadow of the Supermassive Black Hole. Astrophysical Journal Letters. 875 - 1, 2019.
Type of production: Scientific paper **Format:** Journal

21 T. Event Horizon Telescope Collaboration; K. Akiyama; A. Alberdi; ...; G. Zhao; .... First M87 Event Horizon Telescope Results. II. Array and Instrumentation. Astrophysical Journal Letters. 875 - 1, 2019.
Type of production: Scientific paper **Format:** Journal

22 T. Event Horizon Telescope Collaboration; K. Akiyama; A. Alberdi; ...; G. Zhao; .... First M87 Event Horizon Telescope Results. III. Data Processing and Calibration. Astrophysical Journal Letters. 875 - 1, 2019.
Type of production: Scientific paper **Format:** Journal

23 T. Event Horizon Telescope Collaboration; K. Akiyama; A. Alberdi; ...; G. Zhao; .... First M87 Event Horizon Telescope Results. IV. Imaging the Central Supermassive Black Hole. Astrophysical Journal Letters. 875 - 1, 2019.
Type of production: Scientific paper **Format:** Journal

24 T. Event Horizon Telescope Collaboration; K. Akiyama; A. Alberdi; ...; G. Zhao; .... First M87 Event Horizon Telescope Results. V. Physical Origin of the Asymmetric Ring. Astrophysical Journal Letters. 875 - 1, 2019.
Type of production: Scientific paper **Format:** Journal

25 K. Akiyama; A. Alberdi; W. Alef; ...; G. Zhao; .... First M87 Event Horizon Telescope Results. VI. the Shadow and Mass of the Central Black Hole. Astrophysical Journal Letters. 875 - 1, 2019.
Type of production: Scientific paper **Format:** Journal

26 T. Lee; S. Trippe; M. Kino; ...; G.-Y. Zhao; .... Jet kinematics of the quasar 4C+21.35 from observations with the KaVA very long baseline interferometry array. Monthly Notices of the Royal Astronomical Society. 486 - 2, pp. 2412 - 2421. 2019.
Type of production: Scientific paper **Format:** Journal

27 J. Park; K. Hada; M. Kino; ...; G.-Y. Zhao; .... Kinematics of the M87 Jet in the Collimation Zone: Gradual Acceleration and Velocity Stratification. Astrophysical Journal. 887 - 2, 2019.
Type of production: Scientific paper **Format:** Journal

28 G.-Y. Zhao; T. Jung; B.W. Sohn; M. Kino; .... Source-frequency phase-referencing observation of AGNs with kava using simultaneous dual-frequency receiving. Journal of the Korean Astronomical Society. 52 - 1, pp. 23 - 30. 2019.
Type of production: Scientific paper **Format:** Journal

29 S. Koyama; M. Kino; A. Doi; ...; G.-Y. Zhao; .... Stable Radio Core of the Blazar Mrk 501 during High-energy Active State in 2012. Astrophysical Journal. 884 - 2, 2019.
Type of production: Scientific paper **Format:** Journal

30 S. Issaoun; M.D. Johnson; L. Blackburn; ...; G.-Y. Zhao. The Size, Shape, and Scattering of Sagittarius A* at 86 GHz: First VLBI with ALMA. Astrophysical Journal. 871 - 1, 2019.
Type of production: Scientific paper **Format:** Journal

31 O. Porth; K. Chatterjee; R. Narayan; ...; G. Zhao; .... The event horizon general relativistic magnetohydrodynamic code comparison project. Astrophysical Journal, Supplement Series. 243 - 2, 2019.
Type of production: Scientific paper **Format:** Journal

32 J.-C. Algaba; S.-S. Lee; D.-W. Kim; B. Rani; J. Hodgson; M. Kino; S. Trippe; J.-H. Park; G.-Y. Zhao; D.-Y. Byun; M. Gurwell; S.-C. Kang; J.-Y. Kim; J.-S. Kim; S.-W. Kim; B. Lott; A. Miyazaki; K. Wajima. Exploring the Variability of the Flat Spectrum Radio Source 1633+382. I. Phenomenology of the Light Curves. Astrophysical Journal. 852 - 1, 2018.
Type of production: Scientific paper **Format:** Journal

33 J.-C. Algaba; S.-S. Lee; B. Rani; D.-W. Kim; M. Kino; J. Hodgson; G.-Y. Zhao; D.-Y. Byun; M. Gurwell; S.-C. Kang; J.-Y. Kim; J.-S. Kim; S.-W. Kim; J.-H. Park; S. Trippe; K. Wajima. Exploring the Variability of the Flat-spectrum Radio Source 1633+382. II. Physical Properties. Astrophysical Journal. 859 - 2, 2018.
Type of production: Scientific paper **Format:** Journal

34 D.-W. Kim; S. Trippe; S.-S. Lee; J.-Y. Kim; J.-C. Algaba; J. Hodgson; J. Park; M. Kino; G.-Y. Zhao; K. Wajima; J.W. Lee; S. Kang. Exploring the nature of the 2016 γ-ray emission in the blazar 1749+096. Monthly Notices of the Royal Astronomical Society. 480 - 2, pp. 2324 - 2333. 2018.
Type of production: Scientific paper **Format:** Journal

35 J.A. Hodgson; B. Rani; S.-S. Lee; J.C. Algaba; M. Kino; S. Trippe; J.-H. Park; G.-Y. Zhao; D.-Y. Byun; S. Kang; J.-Y. Kim; J.-S. Kim; S.-W. Kim; A. Miyazaki; K. Wajima; J. Oh; D.-w. Kim; M. Gurwell. KVN observations reveal multiple γ-ray emission regions in 3C84?. Monthly Notices of the Royal Astronomical Society. 475 - 1, pp. 368 - 378. 2018.
Type of production: Scientific paper **Format:** Journal

36 J.-Y. Kim; S.-S. Lee; J.A. Hodgson; J.-C. Algaba; G.-Y. Zhao; M. Kino; D.-Y. Byun; S. Kang. Long-Term millimeter VLBI monitoring of M87 with KVN at milliarcsecond resolution: Nuclear spectrum. Astronomy and Astrophysics. 610, 2018.
Type of production: Scientific paper **Format:** Journal

37 J. Park; M. Kam; S. Trippe; S. Kang; D.-Y. Byun; D.-W. Kim; J.-C. Algaba; S.-S. Lee; G.-Y. Zhao; M. Kino; N. Shin; K. Hada; T. Lee; J. Oh; J.A. Hodgson; B.W. Sohn. Revealing the Nature of Blazar Radio Cores through Multifrequency Polarization Observations with the Korean VLBI Network. Astrophysical Journal. 860 - 2, 2018.
Type of production: Scientific paper **Format:** Journal

38 G.-Y. Zhao; J.C. Algaba; S.S. Lee; T. Jung; R. Dodson; M. Rioja; D.-Y. Byun; J. Hodgson; S. Kang; D.-W. Kim; J.-Y. Kim; J.-S. Kim; S.-W. Kim; M. Kino; A. Miyazaki; J.-H. Park; S. Trippe; K. Wajima. The Power of Simultaneous Multi-frequency Observations for mm-VLBI: Beyond Frequency Phase Transfer. Astronomical Journal. 155 - 1, 2018.
Type of production: Scientific paper **Format:** Journal

39 M.D. Johnson; R. Narayan; D. Psaltis; L. Blackburn; Y.Y. Kovalev; C.R. Gwinn; G.-Y. Zhao; G.C. Bower; J.M. Moran; M. Kino; M. Kramer; K. Akiyama; J. Dexter; A.E. Broderick; L. Sironi. The Scattering and Intrinsic Structure of Sagittarius A⋆ at Radio Wavelengths. Astrophysical Journal. 865 - 2, 2018.
Type of production: Scientific paper **Format:** Journal

40 I. Cho; T. Jung; G.-Y. Zhao; K. Akiyama; S. Sawada-Satoh; M. Kino; D.-Y. Byun; B.W. Sohn; K.M. Shibata; T. Hirota; K. Niinuma; Y. Yonekura; K. Fujisawa; T. Oyama. A comparative study of amplitude calibrations for the East Asia VLBI Network: A priori and template spectrum methods. Publications of the Astronomical Society of Japan. 69 - 6, 2017.
Type of production: Scientific paper **Format:** Journal

41 K. Hada; J. Ho PARK; M. Kino; K. Niinuma; B.W. Sohn; H.W. Ro; T. Jung; J.-C. Algaba; G.-Y. Zhao; S.-S. Lee; K. Akiyama; S. Trippe; K. Wajima; S. Sawada-Satoh; F. Tazaki; I. Cho; J. Hodgson; J.A. Lee; Y. Hagiwara; M. Honma; S. Koyama; J. Oh; T. Lee; H. Yoo; N. Kawaguchi; D.-G. Roh; S.-J. Oh; J.-H. Yeom; D.-K. Jung; C. Oh; H.-R. Kim; J.-Y. Hwang; D.-Y. Byun; S.-H. Cho; H.-G. Kim; H. Kobayashi; K.M. Shibata. Pilot KaVA monitoring on the M 87 jet: Confirming the inner jet structure and superluminal motions at sub-pc scales. Publications of the Astronomical Society of Japan. 69 - 4, 2017.
Type of production: Scientific paper **Format:** Journal

42 D.-W. Kim; S. Trippe; S.-S. Lee; J.-H. Park; J.-Y. Kim; J.-C. Algaba; J.A. Hodgson; M. Kino; G.-Y. Zhao; K. Wajima; S. Kang; J. Oh; T. Lee; D.-Y. Byun; S.-W. Kim; J.-S. Kim. The millimeter-radio emission of BL lacertae during two γ-ray outbursts. Journal of the Korean Astronomical Society. 50 - 6, pp. 167 - 178. 2017.
Type of production: Scientific paper **Format:** Journal

43 H. Sudou; S. Iguchi; G.-Y. Zhao. VLBI Monitoring of the Sub-parsec-scale Jet in the Radio Galaxy 3C 66B at 22 GHz. Astrophysical Journal. 841 - 2, 2017.
Type of production: Scientific paper **Format:** Journal

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1 **Title of the work:** Millimeter VLBI observations of Sgr A* with KaVA and KVN
Name of the conference: IAUS 322: The Multi-Messenger Astrophysics of the Galactic Centre
Type of event: Conference
Corresponding author: Yes
City of event: Cairns, Australia
Date of event: 18/07/2016
End date: 22/07/2016
Organising entity: International Astronomical Union
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