



Guang-Yao Zhao

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Summary of CV

This section describes briefly a summary of your 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.

My research topic is studying **supermassive black holes** (SMBHs) and Active Galactic Nuclei (AGNs) with very long baseline interferometry (VLBI). VLBI, which forms a network of radio telescopes, provides the highest resolution in astronomy. It is ideal for studying compact objects like SMBHs, and astrophysical jets that are launched from the vicinity of black holes. 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 carried out postdoctoral research activities with the Korean VLBI Network (KVN). The KVN is a dedicated **millimeter-VLBI** facility. Compared with conventional VLBI (mostly at centimetre wavelengths), mm-VLBI holds the potential of probing closure to the central black hole and offering even higher resolution but also facing new challenges. We established several more unique features for the KVN which could be beneficial for 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 method, 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) establish a catalog of mm-VLBI sources with MASK (Multi-frequency AGN Survey with KVN); 2) expand the KVN into a global simultaneous multi-frequency array. With MASK, we have detected more than twice the number of sources achieved by the other VLBI arrays. For the second project, one of the global partners that have implemented KVN-compatible systems is the Yebes 40-meter telescope in Spain. Successful test observations between KVN and Yebes were achieved in 2018.

Since 2017, I have become a member of the **event horizon telescope (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 image 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 strongest evidence to date for the existence of supermassive black holes and opens a new window onto the study of black holes, their event horizons, and gravity. The EHT result has been well recognized by the scientific community and the public. The black hole image was downloaded ~4.5 billion times. The EHT collaboration was also awarded the breakthrough prize for Fundamental physics 2020.

Currently, I am a postdoc at the **Instituto de Astrofísica de Andalucía - CSIC**, which is also funded by the Severo-Ochoa project. I am also serving as a **coordinator of the EHT**

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scattering working-group. My current focus is EHT observations of the black hole at the center of the Milky Way and introducing the KVN-style receiving system to the next-generation EHT telescopes.

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: 58;

Total number of citations: 2527;

Average number of citations per year during postdoctoral period: 295

h-index: 17;

(reference: Scopus; January 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)

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



Guang-Yao Zhao

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Date of birth: 19/11/1985
Gender: Male
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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

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

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** Michael Janssen; Heino Falcke; Matthias Kadler; Eduardo Ros; Maciek Wielgus; Kazunori Akiyama; Mislav Baloković; Lindy Blackburn; Katherine L. Bouman; Andrew Chael; Chi-kwan Chan; Koushik Chatterjee; Jordy Davelaar; Philip G. Edwards; Christian M. Fromm; Jos{é} L. G{ó}mez; Ciriaco Goddi; Sara Issaoun; Michael D. Johnson; Junhan Kim; Jun Yi Koay; Thomas P. Krichbaum; Jun Liu; Elisabetta Liuzzo; Sera Markoff; Alex Markowitz; Daniel P. Marrone; Yosuke Mizuno; Cornelia Müller; Chunchong Ni; Dominic W. Pesce; Venkatesh Ramakrishnan; Freek Roelofs; Kazi L. J. Rygl; Ilse van Bemmelen; Antxon Alberdi; Walter Alef; Juan Carlos Algaba; Richard Anantua; Keiichi Asada; Rebecca Azulay; Anne-Kathrin Baczko; David Ball; John Barrett; Bradford A. Benson; Dan Bintley; Raymond Blundell; Wilfred Boland; Geoffrey C. Bower; Hope Boyce; Michael Bremer; Christiaan D. Brinkerink; Roger Brissenden; Silke Britzen; Avery E. Broderick; Dominique Brogiere; Thomas Bronzwaer; Do-Young Byun; John E. Carlstrom; Shami Chatterjee; Ming-Tang Chen; Yongjun Chen; Paul M. Chesler; Ilje Cho; Pierre Christian; John E. Conway; James M. Cordes; Thomas M. Crawford; Geoffrey B. Crew; Alejandro Cruz-Orsio; Yuzhu Cui; Mariafelicia De Laurentis; Roger Deane; Jessica Dempsey; Gregory Desvignes; Jason Dexter; Sheperd S. Doleman; Ralph P. Eatough; Joseph Farah; Vincent L. Fish; Ed Fomalont; H. Alyson Ford; Raquel Fraga-Encinas; Per Friberg; Antonio Fuentes; Peter Galison; Charles F. Gammie; Roberto Garc{í}a; Zachary Gelles; Olivier Gentaz; Boris Georgiev; Roman Gold; Arturo I. G{ó}mez-Ruiz; Minfeng Gu; Mark Gurwell; Kazuhiro Hada; Daryl Haggard; Michael H. Hecht; Ronald Hesper; Elizabeth Himwich; Luis C. Ho; Paul Ho; Mareki Honma; Chih-Wei L. Huang; Lei Huang; David H. Hughes; Shiro Ikeda; Makoto Inoue; David J. James; Buell T. Jannuzi; Britton Jeter; Wu Jiang; Alejandra Jimenez-Rosales; Svetlana Jorstad; Taehyun Jung; Mansour Karami; Ramesh Karuppusamy; Tomohisa Kawashima; Garrett K. Keating; Mark Kettenis; Dong-Jin Kim; Jae-Young Kim; Jongsoo Kim; Motoki Kino; Yutaro Kofuji; Shoko Koyama; Michael Kramer; Carsten Kramer; Cheng-Yu Kuo; Tod R. Lauer; Sang-Sung Lee; Aviad Levis; Yan-Rong Li; Zhiyuan Li; Michael Lindqvist; Rocco Lico; Greg Lindahl; Kuo Liu; Wen-Ping Lo; Andrei P. Lobanov; Laurent Loinard; Colin Lonsdale; Ru-Sen Lu; Nicholas R. MacDonald; Jirong Mao; Nicola Marchili; Alan P. Marscher; Iv{á}n Mart{í}-Vidal; Satoki Matsushita; Lynn D. Matthews; Lia Medeiros; Karl M. Menten; Izumi Mizuno; James M. Moran; Kotaro Moriyama; Monika Moscibrodzka; Gibwa Musoke; Alejandro Mus Mej{í}as; Hiroshi Nagai; Neil M. Nagar; Masanori Nakamura; Ramesh Narayan; Gopal Narayanan; Iniyan Natarajan; Antonios Nathanail; Joey Neilsen; Roberto Neri; Aristeidis Noutsos; Michael A. Nowak; Hiroki Okino; H{é}ctor Olivares; Gisela N. Ortiz-Le{ó}n; Tomoaki Oyama; Feryal {é}-zel; Daniel C. M. Palumbo; Jongho Park; Nimesh Patel; Ue-Li Pen; Vincent Pi{é}tu; Richard Plambeck; Aleksandar PopStefanija; Oliver Porth; Felix M. Pözl; Ben Prather; Jorge A. Preciado-L{ó}pez; Dimitrios Psaltis;

Hung-Yi Pu; Ramprasad Rao; Mark G. Rawlings; Alexander W. Raymond; Luciano Rezzolla; Angelo Ricarte; Bart Ripperda; Alan Rogers; Mel Rose; Arash Roshanineshat; Helge Rottmann; Alan L. Roy; Chet Ruszczyk; Salvador Sánchez; David Sánchez-Argüelles; Mahito Sasada; Tuomas Savolainen; F. Peter Schloerb; Karl-Friedrich Schuster; Lijing Shao; Zhiqiang Shen; Des Small; Bong Won Sohn; Jason SooHoo; He Sun; Fumie Tazaki; Alexandra J. Tetarenko; Paul Tiede; Remo P. J. Tilanus; Michael Titus; Pablo Torne; Tyler Trent; Efthalia Traianou; Sascha Trippe; Ilse van Bemmelen; Huib Jan van Langevelde; Daniel R. van Rossum; Jan Wagner; Derek Ward-Thompson; John Wardle; Jonathan Weintraub; Norbert Wex; Robert Wharton; George N. Wong; Qingwen Wu; Doosoo Yoon; Andr   Young; Ken Young; Ziri Younsi; Feng Yuan; Ye-Fei Yuan; J. Anton Zensus; Guang-Yao Zhao; Shan-Shan Zhao and. Event Horizon Telescope observations of the jet launching and collimation in Centaurus A. *Nature Astronomy*. 5 - 10, pp. 1017 - 1028. Springer Science and Business Media {LLC}, 07/2021. Available on-line at: <<https://doi.org/10.1038%2Fs41550-021-01417-w>>.

Type of production: Scientific paper

Format: Journal

- 2** Prashant Kocherlakota; Luciano Rezzolla; Heino Falcke; Christian M. Fromm; Michael Kramer; Yosuke Mizuno; Antonios Nathanail; H  ctor Olivares; Ziri Younsi; Kazunori Akiyama; Antxon Alberdi; Walter Alef; Juan Carlos Algaba; Richard Anantua; Keiichi Asada; Rebecca Azulay; Anne-Kathrin Baczko; David Ball; Mislav Balokovi  ; John Barrett; Bradford A. Benson; Dan Bintley; Lindy Blackburn; Raymond Blundell; Wilfred Boland; Katherine L. Bouman; Geoffrey C. Bower; Hope Boyce; Michael Bremer; Christiaan D. Brinkerink; Roger Brissenden; Silke Britzen; Avery E. Broderick; Dominique Brogiere; Thomas Bronzwaer; Do-Young Byun; John E. Carlstrom; Andrew Chael; Chi-kwan Chan; Shami Chatterjee; Koushik Chatterjee; Ming-Tang Chen; Yongjun Chen; Paul M. Chesler; Ilje Cho; Pierre Christian; John E. Conway; James M. Cordes; Thomas M. Crawford; Geoffrey B. Crew; Alejandro Cruz-Ororio; Yuzhu Cui; Jordy Davelaar; Mariafelicia De Laurentis; Roger Deane; Jessica Dempsey; Gregory Desvignes; Sheperd S. Doeleman; Ralph P. Eatough; Joseph Farah; Vincent L. Fish; Ed Fomalont; Raquel Fraga-Encinas; Per Friberg; H. Alyson Ford; Antonio Fuentes; Peter Galison; Charles F. Gammie; Roberto Garc  a; Olivier Gentaz; Boris Georgiev; Ciriaco Goddi; Roman Gold; Jos   L. G  mez; Arturo I. G  mez-Ruiz; Minfeng Gu; Mark Gurwell; Kazuhiro Hada; Daryl Haggard; Michael H. Hecht; Ronald Hesper; Luis C. Ho; Paul Ho; Mareki Honma; Chih-Wei L. Huang; Lei Huang; David H. Hughes; Shiro Ikeda; Makoto Inoue; Sara Issaoun; David J. James; Buell T. Jannuzi; Michael Janssen; Britton Jeter; Wu Jiang; Alejandra Jimenez-Rosales; Michael D. Johnson; Svetlana Jorstad; Taehyun Jung; Mansour Karami; Ramesh Karuppusamy; Tomohisa Kawashima; Garrett K. Keating; Mark Kettenis; Dong-Jin Kim; Jae-Young Kim; Jongsoo Kim; Junhan Kim; Motoki Kino; Jun Yi Koay; Yutaro Kofuji; Patrick M. Koch; Shoko Koyama; Carsten Kramer; Thomas P. Krichbaum; Cheng-Yu Kuo; Tod R. Lauer; Sang-Sung Lee; Aviad Levis; Yan-Rong Li; Zhiyuan Li; Michael Lindqvist; Rocco Lico; Greg Lindahl; Jun Liu; Kuo Liu; Elisabetta Liuzzo; Wen-Ping Lo; Andrei P. Lobanov; Laurent Loinard; Colin Lonsdale; Ru-Sen Lu; Nicholas R. MacDonald; Jirong Mao; Nicola Marchili; Sera Markoff; Daniel P. Marrone; Alan P. Marscher; Iv  n Mart  n-Vidal; Satoki Matsushita; Lynn D. Matthews; Lia Medeiros; Karl M. Menten; Izumi Mizuno; James M. Moran; Kotaro Moriyama; Monika Moscibrodzka; Cornelia M  ller; Gibwa Musoke; Alejandro Mus Me  as; Hiroshi Nagai; Neil M. Nagar; Masanori Nakamura; Ramesh Narayan; Gopal Narayanan; Iniyar Natarajan; Joseph Neilsen; Roberto Neri; Chunchong Ni; Aristeidis Noutsos; Michael A. Nowak; Hiroki Okino; Gisela N. Ortiz-Le  n; Tomoaki Oyama; Feryal   zel; Daniel C.  M. Palumbo; Jongho Park; Nimesh Patel; Ue-Li Pen; Dominic W. Pesce; Vincent Pi  tu; Richard Plambeck; Aleksandar PopStefanija; Oliver Porth; Felix M. P  tzl; Ben Prather; Jorge A. Preciado-L  pez; Dimitrios Psaltis; Hung-Yi Pu; Venkatesh Ramakrishnan; Ramprasad Rao; Mark G. Rawlings; Alexander W. Raymond; Angelo Ricarte; Bart Ripperda; Freek Roelofs; Alan Rogers; Eduardo Ros; Mel Rose; Arash Roshanineshat; Helge Rottmann; Alan L. Roy; Chet Ruszczyk; Kazi L.  J. Rygl; Salvador S  nchez; David S  nchez-Arg  elles; Mahito Sasada; Tuomas Savolainen; F. Peter Schloerb; Karl-Friedrich Schuster; Lijing Shao; Zhiqiang Shen; Des Small; Bong Won Sohn; Jason SooHoo; He Sun; Fumie Tazaki; Alexandra J. Tetarenko; Paul Tiede; Remo P.  J. Tilanus; Michael Titus; Kenji Toma; Pablo Torne; Tyler Trent; Efthalia Traianou; Sascha Trippe; Ilse van Bemmelen; Huib Jan van Langevelde; Daniel R. van Rossum; Jan Wagner; Derek Ward-Thompson; John Wardle; Jonathan Weintraub; Norbert Wex; Robert Wharton; Maciek Wielgus; George N. Wong; Qingwen Wu; Doosoo Yoon; Andr   Young; Ken Young; Feng Yuan; Ye-Fei Yuan; J. Anton Zensus; Guang-Yao Zhao; Shan-Shan Zhao and. Constraints on black-hole charges with the 2017 {EHT} observations of M87  ast}. *Physical Review D*. 103 - 10, American Physical Society ({APS}), 05/2021. Available on-line at: <<https://doi.org/10.1103%2Fphysrevd.103.104047>>.

Type of production: Scientific paper

Format: Journal

- 3** {EHT MWL Science Working Group}; J.  C. {Algaba}; J. {Anczarski}; K. {Asada}; M. {Balokovi  }; S. {Chandra}; Y. -Z. {Cui}; A.  D. {Falcone}; M. {Giroletti}; C. {Goddi}; K. {Hada}; D. {Haggard}; S. {Jorstad}; A. {Kaur}; T. {Kawashima}; G. {Keating}; J. -Y. {Kim}; M. {Kino}; S. {Komossa}; E.  V. {Kravchenko}; T.  P. {Krichbaum};

S. -S. {Lee}; R. -S. {Lu}; M. {Lucchini}; S. {Markoff}; J. {Neilsen}; M.~A. {Nowak}; J. {Park}; G. {Principe}; V. {Ramakrishnan}; M.~T. {Reynolds}; M. {Sasada}; S.~S. {Savchenko}; K.~E. {Williamson}; {Event Horizon Telescope Collaboration}; Kazunori {Akiyama}; Antxon {Alberdi}; Walter {Alef}; Richard {Anantua}; Rebecca {Azulay}; Anne-Kathrin {Baczko}; David {Ball}; John {Barrett}; Dan {Bintley}; Bradford A. {Benson}; Lindy {Blackburn}; Raymond {Blundell}; Wilfred {Boland}; Katherine L. {Bouman}; Geoffrey C. {Bower}; Hope {Boyce}; Michael {Bremer}; Christiaan D. {Brinkerink}; Roger {Brissenden}; Silke {Britzen}; Avery E. {Broderick}; Dominique {Brogiere}; Thomas {Bronzwaer}; Do-Young {Byun}; John E. {Carlstrom}; Andrew {Chael}; Chi-Kwan {Chan}; Shami {Chatterjee}; Koushik {Chatterjee}; Ming-Tang {Chen}; Yongjun {Chen}; Paul M. {Chesler}; Ilje {Cho}; Pierre {Christian}; John E. {Conway}; James M. {Cordes}; Thomas M. {Crawford}; Geoffrey B. {Crew}; Alejandro {Cruz-Orsorio}; Jordy {Davelaar}; Mariafelicia {de Laurentis}; Roger {Deane}; Jessica {Dempsey}; Gregory {Desvignes}; Jason {Dexter}; Sheperd S. {Doeleman}; Ralph P. {Eatough}; Heino {Falcke}; Joseph {Farah}; Vincent L. {Fish}; Ed {Fomalont}; H. Alyson {Ford}; Raquel {Fraga-Encinas}; Per {Friberg}; Christian M. {Fromm}; Antonio {Fuentes}; Peter {Galison}; Charles F. {Gammie}; Roberto {Garc{\i}a}; Olivier {Gentaz}; Boris {Georgiev}; Roman {Gold}; Jos{\e} L. {G{\o}mez}; Arturo I. {G{\o}mez-Ruiz}; Minfeng {Gu}; Mark {Gurwell}; Michael H. {Hecht}; Ronald {Hesper}; Luis C. {Ho}; Paul {Ho}; Mareki {Honma}; Chih-Wei L. {Huang}; Lei {Huang}; David H. {Hughes}; Shiro {Ikeda}; Makoto {Inoue}; Sara {Issaoun}; David J. {James}; Buell T. {Jannuzi}; Michael {Janssen}; Britton {Jeter}; Wu {Jiang}; Alejandra {Jim{\e}nez-Rosales}; Michael D. {Johnson}; Taehyun {Jung}; Mansour {Karami}; Ramesh {Karuppusamy}; Mark {Kettenis}; Dong-Jin {Kim}; Jongsoo {Kim}; Junhan {Kim}; Jun Yi {Koay}; Yutaro {Kofuji}; Patrick M. {Koch}; Shoko {Koyama}; Michael {Kramer}; Carsten {Kramer}; Cheng-Yu {Kuo}; Tod R. {Lauer}; Aviad {Levis}; Yan-Rong {Li}; Zhiyuan {Li}; Michael {Lindqvist}; Rocco {Lico}; Greg {Lindahl}; Jun {Liu}; Kuo {Liu}; Elisabetta {Liuizzo}; Wen-Ping {Lo}; Andrei P. {Lobanov}; Laurent {Loinard}; Colin {Lonsdale}; Nicholas R. {MacDonald}; Jirong {Mao}; Nicola {Marchili}; Daniel P. {Marrone}; Alan P. {Marscher}; Iv{\a}n {Mart{\i}-Vidal}; Satoki {Matsushita}; Lynn D. {Matthews}; Lia {Medeiros}; Karl M. {Menten}; Izumi {Mizuno}; Yosuke {Mizuno}; James M. {Moran}; Kotaro {Moriyama}; Monika {Moscibrodzka}; Cornelia {M{\u}ller}; Gibwa {Musoke}; Alejandro Mus {Mej{\i}as}; Hiroshi {Nagai}; Neil M. {Nagar}; Masanori {Nakamura}; Ramesh {Narayan}; Gopal {Narayanan}; Inian {Natarajan}; Antonios {Nathanail}; Roberto {Neri}; Chunchong {Ni}; Aristeidis {Noutsos}; Hiroki {Okino}; H{\e}ctor {Olivares}; Gisela N. {Ortiz-Le{\o}n}; Tomoaki {Oyama}; Feryal {{\O}zel}; Daniel C.~M. {Palumbo}; Nimesh {Patel}; Ue-Li {Pen}; Dominic W. {Pesce}; Vincent {Pi{\e}tu}; Richard {Plambeck}; Aleksandar {Popstefanija}; Oliver {Porth}; Felix M. {P{\o}tzl}; Ben {Prather}; Jorge A. {Preciado-L{\o}pez}; Dimitrios {Psaltis}; Hung-Yi {Pu}; Ramprasad {Rao}; Mark G. {Rawlings}; Alexander W. {Raymond}; Luciano {Rezzolla}; Angelo {Ricarte}; Bart {Ripperda}; Freek {Roelofs}; Alan {Rogers}; Eduardo {Ros}; Mel {Rose}; Arash {Roshanineshat}; Helge {Rottmann}; Alan L. {Roy}; Chet {Ruszczyk}; Kazi L.~J. {Rygl}; Salvador {S{\a}nchez}; David {S{\a}nchez-Arguelles}; Tuomas {Savolainen}; F. Peter {Schloerb}; Karl-Friedrich {Schuster}; Lijing {Shao}; Zhiqiang {Shen}; Des {Small}; Bong Won {Sohn}; Jason {Soohoo}; Broadband Multi-wavelength Properties of M87 during the 2017 Event Horizon Telescope Campaign. The Astrophysical Journal Letters. 911 - 1, pp. L11 - L11. 04/2021.

Type of production: Scientific paper

Format: Journal

- 4 Yu-Zhu Cui; Kazuhiro Hada; Motoki Kino; Bong-Won Sohn; Jongho Park; Hyun-Wook Ro; Satoko Sawada-Sato; Wu Jiang; Lang Cui; Mareki Honma; Zhi-Qiang Shen; Fumie Tazaki; Tao An; Ilje Cho; Guang-Yao Zhao; Xiao-Peng Cheng; Kotaro Niinuma; Kiyoaki Wajima; Ying-Kang Zhang; Noriyuki Kawaguchi; Juan-Carlos Algaba; Shoko Koyama; Tomoya Hirota; Yoshinori Yonekura; Nobuyuki Sakai; Bo Xia; Yong-Bin Jiang; Lin-Feng Yu; Wei Gou; Ju-Yeon Hwang; Yong-Chen Jiang; Yun-Xia Sun; Dong-Kyu Jung; Hyo-Ryoung Kim; Jeong-Sook Kim; Hideyuki Kobayashi; Jee-Won Lee; Jeong-Ae Lee; Hua Zhang; Guang-Hui Li; Zhi-Qiang Xu; Peng Li; Jung-Hwan Oh; Se-Jin Oh; Chung-Sik Oh; Tomoaki Oyama; Duk-Gyoo Roh; Katsunori-M Shibata; Wen Guo; Rong-Bing Zhao; Wei-Ye Zhong; Jin-Qing Wang; Wen-Jun Yang; Hao Yan; Jae-Hwan Yeom; Bin Li; Xiao-Fei Li; Jian-Ping Yuan; Jian Dong; Zhong Chen; Kazunori Akiyama; Keiichi Asada; Do-Young Byun; Yoshiaki Hagiwara; Jeffrey Hodgson; Tae-Hyun Jung; Kee-Tae Kim; Sang-Sung Lee; Kunwoo Yi; Qing-Hui Liu; Xiang Liu; Ru-Sen Lu; Masanori Nakamura; Sascha Trippe; Na Wang; Xue-Zheng Wang; Bo Zhang. East Asian VLBI Network observations of active galactic nuclei jets: imaging with KaVA plus Tianma plus Nanshan. Research in Astronomy and Astrophysics. 2021. Available on-line at: <<http://doi.org/10.1088/1674-4527/21/8/205>>.

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Format: Journal

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Format: Journal

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Savolainen; F. Peter Schloerb; Karl-Friedrich Schuster; Lijing Shao; Zhiqiang Shen; Des Small; Bong Won Sohn; Jason SooHoo; He Sun; Fumie Tazaki; Alexandra J. Tetarenko; Paul Tiede; Remo P. J. Tilanus; Michael Titus; Kenji Toma; Pablo Torne; Tyler Trent; Efthalia Traianou; Sascha Trippe; Ilse van Bommel; Huib Jan van Langevelde; Daniel R. van Rossum; Jan Wagner; Derek Ward-Thompson; John Wardle; Jonathan Weintraub; Norbert Wex; Robert Wharton; Maciek Wielgus; George N. Wong; Qingwen Wu; Doosoo Yoon; Andre Young; Ken Young; Feng Yuan; Ye-Fei Yuan; J. Anton Zensus; Guang-Yao Zhao; Shan-Shan Zhao; Gabriele Bruni; A. Gopakumar; Antonio Hernandez-Gomez; Ruben Herrero-Illana; Adam Ingram; S. Komossa; Y. Y.... . Polarimetric Properties of Event Horizon Telescope Targets from ALMA. *Astrophysical Journal Letters*. 2021. Available on-line at: <<http://doi.org/10.3847/2041-8213/ABEE6A>>.

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Format: Journal

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Type of production: Scientific paper

Format: Journal

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Type of production: Scientific paper

Format: Journal



- 11** Event Horizon Telescope imaging of the archetypal blazar 3C 279 at an extreme 20 microarcsecond resolution. 2020.
Type of production: Scientific paper **Format:** Journal
- 12** Monitoring the Morphology of M87* in 2009-2017 with the Event Horizon Telescope. 2020.
Type of production: Scientific paper **Format:** Journal
- 13** THEMIS: A Parameter Estimation Framework for the Event Horizon Telescope. 2020.
Type of production: Scientific paper **Format:** Journal
- 14** Verification of Radiative Transfer Schemes for the EHT. 2020.
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- 15** Stable Radio Core of the Blazar Mrk 501 during High-energy Active State in 2012. 18/10/2019.
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Total no. authors: 348
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Degree of contribution: Author or co-author of article in journal without external admissions assessment committee
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Corresponding author: Yes
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- 27** The Size, Shape, and Scattering of Sagittarius A* at 86GHz: First VLBI with ALMA. 2019.
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- 29** Revealing the Nature of Blazar Radio Cores through Multifrequency Polarization Observations with the Korean VLBI Network. 19/06/2018.
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Position of signature: 1
Total no. authors: 18 **Corresponding author:** Yes
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Type of production: Scientific paper **Format:** Journal
- 41** Millimeter VLBI observations of Sgr A* with KaVA and KVN. 2016.
Type of production: Scientific paper **Format:** Journal
- 42** THE AUTOMATIC CALIBRATION OF KOREAN VLBI NETWORK DATA. 2016.
Type of production: Scientific paper **Format:** Journal
- 43** Guang-Yao Zhao; Yongjun Chen; Zhiqiang Shen; Hiroshi Sudou; Satoru Iguchi. MULTI-EPOCH MULTI-FREQUENCY VLBI STUDY OF THE PARSEC-SCALE JET IN THE BLAZAR 3C 66A. The Astronomical Journal. 149 - 2, pp. 137 - 144. (Spain): 08/01/2015.
Type of production: Scientific paper **Format:** Journal
Position of signature: 1
Total no. authors: 5 **Corresponding author:** Yes
- 44** Juan Carlos Algaba Marcos; Guang-Yao Zhao; Sang-Sung Lee; Do-Young Byun. INTERFEROMETRIC MONITORING OF GAMMA-RAY BRIGHT ACTIVE GALACTIC NUCLEI II: FREQUENCY PHASE TRANSFER. Journal of the Korean Astronomical Society. 48 - 5, pp. 237 - 255. 2015.
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- 45** Warping and tearing of misaligned circumbinary disks around eccentric supermassive black hole binaries. 2015.
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- 46** WARPED CIRCUMBINARY DISKS IN ACTIVE GALACTIC NUCLEI. 03/07/2014.
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- 47** Helical Magnetic Fields in AGN Jets. 2014.
Type of production: Scientific paper **Format:** Journal
- 48** Multi-Frequency VLBA Studies of the Parsec-Scale Jets in 3C 66A and 3C 66B. 2014.
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- 49** RADIATION-DRIVEN WARPING OF CIRCUMBINARY DISKS AROUND ECCENTRIC YOUNG STAR BINARIES. 2014.
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- 50** VLBI observations of bright AGN jets with the KVN and VERA Array (KaVA): Evaluation of imaging capability. Publications of the Astronomical Society of Japan. 66 - 6, 2014.
Type of production: Scientific paper **Format:** Journal
Position of signature: 6
Total no. authors: 72
- 51** AN HOURGLASS MODEL FOR THE FLARE OF HST-1 IN M87. The Astronomical Journal. 146 - 6, pp. 155. 2013.
Type of production: Scientific paper **Format:** Journal
Position of signature: 2
Total no. authors: 5
- 52** Guang-Yao Zhao; Yongjun Chen; Zhiqiang Shen; Hiroshi Sudou. Position Measurements of the Core in 3C 66B. Journal of Astrophysics and Astronomy. 32 - 1, 2011.
Type of production: Scientific paper **Format:** Journal
Position of signature: 1
Total no. authors: 7
- 53** Yongjun Chen; Guang-Yao Zhao; Zhiqiang Shen. The core-like nature of HST-1 in the M87 jet. Monthly Notice of the Royal Astronomical Society. 416 - 1, pp. 109 - 113. 2011.
Type of production: Scientific paper **Format:** Journal
Position of signature: 2
Total no. authors: 3

Works submitted to national or international conferences

- 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

City organizing entity: Seo-gu,

Type of contribution: Scientific paper

Guang-Yao Zhao. "Millimeter VLBI observations of Sgr A* with KaVA and KVN". 2017.

2 Title of the work: KVN Source-Frequency Phase-Referencing Observation of 3C 66A and 3C 66B

Name of the conference: 12th Asia-Pacific Regional IAU Meeting

Type of event: Conference

Corresponding author: Yes

City of event: Daejeon, Republic of Korea

Date of event: 18/08/2014

End date: 22/08/2014

Organising entity: Korea Astronomy and Space Science Institute

City organizing entity: Daejeon, Republic of Korea

Type of contribution: Scientific paper

Guang-Yao Zhao. "KVN Source-Frequency Phase-Referencing Observation of 3C 66A and 3C 66B".

3 Title of the work: Study of the parsec-scale jet in the blazar 3C 66A with VLBA

Name of the conference: IAUS 290: FEEDING COMPACT OBJECTS: Accretion on All Scales

Type of event: Conference

Corresponding author: Yes

City of event: Beijing, China

Date of event: 20/08/2012

End date: 24/08/2012

Organising entity: International Astronomical Union

Type of contribution: Scientific paper

Guang-Yao Zhao. "Study of the parsec-scale jet in the blazar 3C 66A with VLBA". 2013.