

AIYUAN YANG | CURRICULUM VITAE

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Education & Background

Max Planck Institute for Radio Astronomy (MPIfR)

Postdoctoral researcher

National Astronomical Observatories (NAOC), CAS

Ph.D. student of Astrophysics

University of Hertfordshire

SKA Joint Ph.D. student of Astrophysics

Xinjiang Astronomical Observatories (XAO), CAS & NAOC

XAO & NAOC Joint Master student of Astrophysics

Xinjiang University (XJU)

Student of Physics

Aug. 2018 – Now

Bonn, Germany

Sep. 2014 – Aug. 2018

Beijing, China

Feb. 2016 – Oct. 2017

Hatfield, UK

Sep. 2011 – Jul. 2014

Xinjiang & Beijing, China

Sep. 2007 – Jul. 2011

Xinjiang, China

Research Interests

- The birth of H II regions, HCH II and UCH II regions
- Molecular outflows and radio jets in massive star formation
- Multi-band study (from radio to near-infrared) of ISM related to star formation
- Multi-band (from radio to sub-mm) study of RRLs
- Young PNe: kinematic distances and masers
- Kinematic distances of radio objects using HI and CO
- Observations of radio interferometer and single-dish telescopes

Research Experience & Projects

Enrolled in the VLA survey: GLOSTAR | *Postdoc, Prof. Dr. K. M. Menten*

2018-Now

- The GLOSTAR survey ($2^\circ < \ell < 60^\circ$, $-1^\circ < b < 1^\circ$) observes lines (formaldehyde, methanol maser, and radio recombination lines) and continuum, using VLA B- and D-configuration and the Effelsberg at C-band.
- Calibrate the B-configuration continuum data ($2^\circ < \ell < 28^\circ$, $36^\circ < \ell < 40^\circ$) of the GLOSTAR survey, using Orbit.
- Work on the source extraction, classification, and catalog construction of the GLOSTAR survey. Papers In Prep.
- Work on the follow-up observations of H II regions and PNe of the GLOSTAR survey. Data Observed and Planned.

Hyper-compact H II regions | *Ph.D., Prof. Dr. Mark Thompson, Dr. James Urquhart*

2016-Now

- To understand the nature of Hyper-compact H II (HCH II) regions and the rarity, we search for HCH II regions.
- To get HCH II region candidates, we first obtain 534 positive spectral radio objects ($S \propto \nu^{+\alpha}$; $\alpha > 0$), by measuring their spectral index between 1-5 GHz from VLA Surveys of THOR, CORNISH, and MAGPIS.
- To identify HCH II region candidates from the 534 positive spectral radio objects, we analyse their multi-band emission properties, based on data from surveys of FIR (Hi-GAL), MIR (GLIMPSE), NIR (UKIDSS), submm (ATLASGAL).
- To study the HCH II region candidates, we observed them at VLA X-band (8-12 GHz) and K-band (18-26 GHz).
- To measure the physical properties of the HCH II region candidates, we reduced the VLA data and build their radio SED between 1-26 GHz. See [Yang+2019](#) [🔗](#); [Yang+2021a](#) [🔗](#)

Molecular Outflows of massive clumps | *Ph.D., Prof. Dr. Mark Thompson, Dr. James Urquhart*

2017-Now

- To identify outflows, we used the ATLASGAL clumps and the CHIMPS data, based on the Python script.
- To systematically discuss when outflow activity switches on, how it evolves in the massive clumps, we map the outflow lobes of these outflow clumps and measure their outflow properties. See [Yang+2018](#) [🔗](#)
- Join the SEDIGISM survey and the CHIMPS survey to work on outflows as PI. [Yang+2021b](#) [🔗](#)

Kinematic distance of Galactic Planetary Nebulae (PNe) | *Ph.D., Prof. Dr. Wenwu Tian*

2014-2016

- To know the research status of PNe's distance, we summarised the main distance measurements in [Yang+2015](#) [🔗](#)
- To estimate the kinematic distances of radio PNe, we analysed the velocity of emission/absorption features of HI and CO for the 18 PNe, based on the axisymmetric rotation curve model for the Galaxy and the script written by C.
- To obtain the spectra of HI and CO for 18 PNe, we used the software KVIS and archival data. See [Yang+2016](#) [🔗](#)

Pulsar nulling phenomena | *Master, Prof. Dr. Jinlin Han; Prof. Dr. Na Wang*

2011-2014

- To understand the pulsar nulling phenomenon, we proposed a new method and applied it to 10 nulling pulsars from a total sample of ~ 185 summarised from literature. See [Yang+2014](#) [🔗](#)

Other PI projects | *MPIfR*

In progress

- The study of radio recombination lines for 114 young regions, with PI data from APEX, IRAM, and Effelsberg.
- The study of RRL, continuum, and outflows for HCH II regions at multi-scales ($\sim 0.2''$, $2''$, $20''$, $30''$), using PI and archival data from ALMA, VLA, APEX, IRAM, and Effelsberg.
- Study the maser-emitting planetary nebulae, with PI data observed by VLA and Effelsberg.
- Investigate the interesting outflows with $70 \mu\text{m}$ dark, extremely high-velocity wings, and disk-like structure candidates using archival and PI data.

Publications

As of Nov. 2021: **7 first-author papers:** 6 published and 1 In press;
15 co-authored papers: 10 published, 1 In press, and 5 under review;
22 papers in total, 200 citations. See the ADS Public Library [↗](#)

• First-Author Papers

7. **A. Y. Yang**, J. S. Urquhart; M. A. Thompson; K. M. Menten; F. Wyrowski; 2021, & The SEDIGISM Team, A&A, **Accepted**; “*The SEDIGISM survey: a search for molecular outflows*” [arXiv:2111.10850](#) [↗](#)
6. **A. Y. Yang**; J. S. Urquhart; M. A. Thompson; K. M. Menten; F. Wyrowski; A. Brunthaler; W. W. Tian; M. Rugel; X. L. Yang; S. Yao; M. Mutale, 2021, A&A, 645A, 110Y, 2021, “*A population of hypercompact H II regions identified from young H II regions*”; [arXiv:2011.07620](#) [↗](#)
5. **A. Y. Yang**; M. A. Thompson; W. W. Tian, S. Bihr; H. Beuther; L. Hindson, 2019, MNRAS, 482, 2681Y; “*A search for hyper-compact HII regions in the Galactic Plane*”; [arXiv:1809.00404](#) [↗](#)
4. **A. Y. Yang**; M. A. Thompson; J. S. Urquhart; W. W. Tian; 2018, ApJS, 235, 3; “*Massive Outflows Associated with ATLASGAL Clumps*”; [arXiv:1712.04599](#) [↗](#)
3. **A. Y. Yang**; W. W. Tian; H. Zhu; D. Wu; 2016, ApJS, 223, 6; “*Kinematic Distances of Galactic Planetary Nebulae*”; [arXiv:1601.03269](#) [↗](#)
2. **A. Y. Yang**; H. Zhu; W. W. Tian; D. Wu; 2015, Progress in Astronomy (Chinese), 33, 284; “*The Current Research of Planetary Nebulae Distance*” [↗](#)
1. **A. Y. Yang**; J. L. Han; N. Wang; 2014, SCIENCE CHINA Physics, Mechanics & Astronomy, 57(8), 1600-1606; “*A New Method to Analysis Pulsar Nulling Phenomena*”; [arXiv:1310.6610](#) [↗](#)

• Co-Author Papers

15. K. R. Neralwar; K. M. Menten; ..., **A. Y. Yang**; 2021, & The SEDIGISM Team; A&A, Submitted.; “*The SEDIGISM survey: Connection between cloud morphology and integrated properties*”;
14. K. R. Neralwar; K. M. Menten; ...; **A. Y. Yang**; & The SEDIGISM Team, 2021, A&A, Submitted.; “*The SEDIGISM survey: the influence of spiral arms on the molecular gas distribution of the inner Milky Way*”;
13. Jun Yang; Yongjun Chen, Leonid I. Gurvits; Zsolt Paragi, **A. Y. Yang**, Xiaolong Yang and Zhiqiang Shen; 2021, MNRAS, Submitted.; “*Structural and spectral properties of Galactic plane variable radio sources*”;
12. Shan Su-Su; Fan Yang; You-Jun Lu; Xing Wei; Wen-Wu Tian; Hai-Yan Zhang; Rui Guo; Xiao-Hong Cui; **A. Y. Yang**; Bo Zhang; and Ji-Feng Liu; 2021, ApJS, Submitted.; “*Significant TESS Timing Offsets of 31 Hot Jupiters*”;
11. J. S. Urquhart; ...; K. M. Menten; ..., **A. Y. Yang**, 2021, MNRAS, Accepted; “*ATLASGAL – Evolutionary trends in high-mass star formation*”; [arXiv:2111.12816](#) [↗](#)
10. D. Colombo; K. M. Menten; ..., **A. Y. Yang**; & The SEDIGISM Team, 2021, A&A, Accepted; “*The SEDIGISM survey: the influence of spiral arms on the molecular gas distribution of the inner Milky Way*”; [arXiv:2110.06071](#) [↗](#)
9. A. Brunthaler; K. M. Menten; ..., **A. Y. Yang**; & The GLOSTAR Team, 2021, A&A, 651, A85, **MPIfR/NRAO press release**, “*A global view on star formation: The GLOSTAR Galactic Plane Survey I. Overview and first results for the Galactic longitude range $28^\circ < \ell < 36^\circ$* ”; [arXiv:2106.00377](#) [↗](#)
8. Dokara, Rohit., K. M. Menten, ..., **A. Y. Yang**; & The GLOSTAR Team; 2021, A&A, 651, A86, **MPIfR/NRAO press release**; “*A global view on star formation: The GLOSTAR Galactic plane survey. II. Supernova Remnants in the first quadrant of the Milky Way*”; [arXiv:2103.06267](#) [↗](#)
7. Ortiz-León Gisela N.; K. M. Menten; ..., **A. Y. Yang**; & The GLOSTAR Team; , 2021, A&A, 651, A87, **MPIfR/NRAO press release**; “*A Global View on Star Formation: The GLOSTAR Galactic Plane Survey. III. 6.7 GHz Methanol maser survey in Cygnus X*”; [arXiv:2105.07471](#) [↗](#)
6. H. Nguyen, K. M. Menten, ..., **A. Y. Yang**; & The GLOSTAR Team; 2021; A&A, 651, A88, **MPIfR/NRAO press release**; “*A global view on star formation: The GLOSTAR Galactic plane survey IV. Radio continuum detections of young stellar objects in the Galactic Centre region*”; [arXiv:2105.03212](#) [↗](#)
5. Eden, D. J., ..., **A. Y. Yang**; & The CHIMPS Team; 2020, MNRAS, 498, 5936E; “*CHIMPS2: survey description and ^{12}CO emission in the Galactic Centre*”; [arXiv:2009.05073](#) [↗](#)
4. S. S. Shan; H. Zhu; W. W. Tian; H. Y. Zhang; **A. Y. Yang**; M. F. Zhang; 2019, RAA, 19, 92S; “*The distance measurements of supernova remnants in the fourth Galactic quadrant*”; [arXiv:1901.02882](#) [↗](#)
3. X. Bai; ...; **A. Y. Yang** et al., 2019, “*The Large High Altitude Air Shower Observatory (LHAASO) Science White Paper*”; [arXiv:1905.02773](#) [↗](#)
2. S. S. Shan; H. Zhu; W. W. Tian; M. F. Zhang; H. Y. Zhang; D. Wu; **A. Y. Yang**; 2019, ApJS, 236, 35S; “*Distances of Galactic Supernova Remnants Using Red Clump Stars*”; [arXiv:1810.06014](#) [↗](#)
1. M. A. Thompson; ...; **A. Y. Yang**; 2016; “*MeerGAL: the MeerKAT Galactic Plane Survey*” [↗](#)

Approved: 1067.2h | New Submitted: 80.7 h | PI: 375.6 h | Co-I: 772.3 h

Observing experience: IRAM-30 m(>50 h, on site+remote) | APEX (>200 h, 4 weeks onsite)

Effelsberg 100 m (>200 h, remote) | VLA (>70 h, Schedule arrangement)

• **PI proposals** | Approved: 294.1 h | New Submitted: 62 h

14. PI: **Aiyuan Yang, Approved**, CoI: J. S. Urquhart, ID: VLA/22A-297, Aug. 2021, A-config, 12 h;
13. PI: **Aiyuan Yang, Approved**, Effelsberg ID: 19-21, 2021, 20.6 h;
12. PI: **Aiyuan Yang, Submitted**, Effelsberg ID: 101-21, 2021, 62 h;
11. PI: **Aiyuan Yang, Observed**, CoI: the GLOSTAR team., ID: VLA/21B-131, 2020, 2 h;
10. PI: **Aiyuan Yang, Observed**, CoI: F. Wyrowski, K. M. Menten et al., Effelsberg ID: 77-19, 2019, 88 h;
9. PI: **Aiyuan Yang, Observed**, CoI: F. Wyrowski, K. M. Menten et al., IRAM ID: 043-19, 2019, 33 h;
8. PI: **Aiyuan Yang, Observed**, CoI: M. A. Thompson, W. W. Tian, ID: VLA/19B-040, Feb. 2019, D-config, 13 h;
7. PI: **Aiyuan Yang, Observed**, CoI: M. A. Thompson, W. W. Tian, ID: VLA/19B-041, Feb. 2019, D-config, 4.5 h;
6. PI: **Aiyuan Yang, Observed**, CoI: F. Wyrowski, K. M. Menten et al., APEX project ID: 9516A-2019, ~100 h;
5. PI: **Aiyuan Yang, Observed**, CoI: M. A. Thompson, W. W. Tian, ID: VLA/18B-064, Feb. 2018, C-config, 4.5 h;
4. PI: **Aiyuan Yang, Observed**, CoI: M. A. Thompson, W. W. Tian, ID: VLA/18B-063, Feb. 2018, C-config, 13 h;
3. PI: **Aiyuan Yang, Observed**, CoI: M. A. Thompson, W. W. Tian, ID: VLA/18B-065, Feb. 2018, C-config, 9 h;
2. PI: **Aiyuan Yang, Observed**, CoI: M. A. Thompson, W. W. Tian, ID: VLA/18A-066, 2018, A-config, 13.5 h;
1. PI: **Aiyuan Yang, Observed**, CoI: M. A. Thompson, W. W. Tian, ID: VLA/17A-070, C-config, Aug. 2017, 3 h;

• **Co-I proposals** | Approved: 772.3 h | New Submitted: 0.0 h

6. CoI: **Aiyuan Yang, Approved**, PI: Wenjin Yang; & K. M. Menten et al., Effelsberg ID: 17-21, 2021, 37.6 h;
5. CoI: **Aiyuan Yang, Approved**, PI: K. M. Menten, Effelsberg ID: 102-20, 2020, 600 h;
4. CoI: **Aiyuan Yang, Approved**, PI: M. Rugel; & K. M. Menten et al., Effelsberg ID: 13-20, 2020, 30 h;
3. CoI: **Aiyuan Yang, Approved**, PI: R. Dokara; & K. M. Menten, et al., ID: VLA/22A-172, 2021, D-config, 8.7 h;
2. CoI: **Aiyuan Yang, Approved**, PI: A. Brunthaler; & K. M. Menten et al., ID: VLBA/22A-390, 2021, 72 h;
1. CoI: **Aiyuan Yang, Approved**, PI: J. S. Urquhart; & K. M. Menten et al., ID: ATCA/C3446, 2021, 24 h;

Language and Skills

- **Computer Language:** python, C, R, and HTML
- **Language:** English (fluent), Deutsch (beginner); Chinese (first language)
- **software:** CASA, Obit, KVIS, TOPCAT, DS9, AEGERAN, BLOBCAT, Latex, and GILDAS

Honors and Awards

- CAS Presidential Scholarship (2018).
- China Scholarship Council Scholarship, SKA project, China-UK (2016-2017)
- National Scholarship of China (2015-2016)
- Advanced Micro Devices (AMD) Scholarship at NAOC (2015-2016)
- Merit Student at NAOC (2014-2015)
- Enrolled in Chinese Academy of Sciences (CAS) without entrance examination (2011)
- Outstanding student leader of College of Physics Science and Technology at XJU (2009)
- Government grants for outstanding students (2007-2011)

Presentations

- Invited online talk, The 8th Nanjing University Young Scholar Forum, Nov. 2021, “*A multi-band study of ISM: outflows, HII regions, Planetary nebulae*”
- Invited online talk, The SEDIGISM workshop, Bonn, Germany, Sep. 2021, “*Molecular outflows in the SEDIGISM*”
- Talk at the MPIfR, Bonn, Germany, March. 2020, “*Hypercompact HII regions identified from young HII regions*”
- Talk at the MPIfR, Bonn, Germany, Nov. 2018, “*Multi-band study of ISM related to massive star formation*”
- Seminar talk, Chinese radio astronomy annual conference, Hefei, Anhui, China, Nov. 2017, “*Searching for hyper-compact HII regions using JVLA survey data*”
- Seminar talk, the 2nd Chinese annual conference of SKA, Shanghai, China, Dec., 2017, “*A search for steep positive radio spectrum object: make predictions for SKA and its precursors*”

Professional References

Prof. Dr. Karl M. Menten

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Prof. Dr. Mark Thompson:

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