

AIYUAN YANG | CURRICULUM VITAE

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Education & Background

Max Planck Institute for Radio Astronomy (MPIfR)

Postdoctoral researcher

Aug. 2018 – Now

Bonn, Germany

National Astronomical Observatories (NAOC), CAS

Ph.D. student of Astrophysics

Sep. 2014 – Aug. 2018

Beijing, China

University of Hertfordshire

SKA Joint Ph.D. student of Astrophysics

Feb. 2016 – Oct. 2017

Hatfield, UK

Xinjiang Astronomical Observatories (XAO), CAS & NAOC

XAO & NAOC Joint Master student of Astrophysics

Sep. 2011 – Jul. 2014

Xinjiang & Beijing, China

Xinjiang University (XJU)

Student of Physics

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.

As of Nov. 2021: **7 first-author papers:** 6 published and 1 In press;
16 co-authored papers: 10 published, 1 In press, and 6 under review;
23 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 H II 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

16. W. J. Yang, K. M. Menten, **A. Y. Yang**, F. Wyrowski, Y. Gong, S. P. Ellingsen, C. Henkel, X. Chen, Y. Xu, Submitted.; “*Redshifted methanol absorption tracing infall motions of high-mass star formation regions*”
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-Fen 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** | Total Approved: 325.1

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** | Total Approved: 772.3 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, “中科院院长奖” (2018)
- China Scholarship Council Scholarship, SKA project, China-UK, “国家留学基金委奖学金” (2016)
- National Scholarship of China, “国家奖学金” (2016)
- Advanced Micro Devices (AMD) Scholarship at NAOC, “AMD奖学金” (2015)
- Merit Student at CAS, “中科院三好学生” (2015)
- Volunteer of the CAS Public Science Day, “中科院公众科学日志愿者” (2013)
- Valuable volunteer of IAU XXIII General Assembly, “第28届国际天文学联合会(IAU)志愿者” (2012)
- Enrolled in CAS without entrance examination, “推荐免试中科院研究生” (2011)
- Outstanding student leader of College of Physics Science and Technology at XJU (2009)
- Government grants for outstanding students (2007-2011)

Presentations and Meetings

- Invited online talk, The SEDIGISM workshop, Bonn, Germany, Sep. 2021, “*Molecular outflows in the SEDIGISM*”
- MPIfR Group Talk, Bonn, Germany, March. 2020, “*Hypercompact H II regions identified from young H II regions*”
- MPIfR Group Talk, 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 H II 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

Director of Department Millimeter- and Submillimeter Astronomy, Max-Planck Institut für Radioastronomie;

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Prof. Dr. Wenwu Tian

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Prof. Dr. Mark Thompson:

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📍 Leeds, LS2 9JT, UK;

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Dr. James Urquhart

Head of Astronomy and Planetary Science Group;

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