Aiyuan Yang | Curriculum Vitae

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Education & Background

Max Planck Institute for Radio Astronomy (MPIfR) — **Aug. 2018 – Now**
Postdoctoral researcher — *Bonn, Germany*

National Astronomical Observatories (NAOC), CAS — **Sep. 2014 – Aug. 2018**
Ph.D. student of Astrophysics — *Beijing, China*

University of Hertfordshire — **Feb. 2016 – Oct. 2017**
SKA Joint Ph.D. student of Astrophysics — *Hatfield, UK*

Xinjiang Astronomical Observatories (XAOC), CAS & NAOC — **Sep. 2011 – Jul. 2014**
XAOC & NAOC Joint Master student of Astrophysics — *Xinjiang & Beijing, China*

Xinjiang University (XJU) — **Sep. 2007 – Jul. 2011**
Student of Physics — *Xinjiang, China*

Research Interests

- The birth of HII regions: HCHII and UCHII regions
- Line study to investigate the outflow properties of the star formation
- Multi-band study (from radio to near infrared) of ISM related to star formation
- Multi-band (from radio to submm) 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 ($2° < \ell < 60°, -1° < b < 1°$) 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 ($2° < \ell < 28°, 36° < \ell < 40°$) of the GLOSTAR survey, using Obit.
- Work on the source extraction, classification, and catalog construction of the GLOSTAR survey. Papers In Prep.
- Work on the follow-up observations of HII regions and PNe of the GLOSTAR survey. Data Observed and Planned.

Hyper-compact HII regions | *Ph.D., Prof. Dr. Mark Thompson* **2016-Now**

- To understand the nature of Hyper-compact HII (HCHII) regions and its rarity, we search for HCHII regions.
- To get HCHII 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 HCHII region candiates 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 HCHII 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 HCHII region candidates, we reduced the VLA data and build their radio SED between 1-26 GHz. See Paper I; Paper II

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 Paper I
- Join the SEDIGISM survey and the CHIMPS survey to work on outflows as PI. Paper II is under review.

Kinematic distance of Galactic Planetary Nebulae (PNe) | *Ph.D., Prof. Dr. Wenwu Tian,* **2014-2016**

- To investigate the distance of PNe, we reviewed the major methods of their distance measurements. See Paper I
- 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 Paper II

Pulsar nulling phenomena | *Master, Prof. Dr. Jinlin Han* **2011-2014**

- To understand 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 The Paper

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 molecular outflows for HCHII regions, with 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 μm dark, extremely high-velocity wings, and disk-like structure candidates using archival and PI data from Effelsberg.

Publications

As of Nov. 2021: **7 first-author papers:** 6 published and 1 under review;
15 co-authored papers: 10 published and 5 under review;
22 papers in total, 187 citations, h-index = 6. See the ADS Public Library

First-Author Papers

7. **A. Y. Yang**, Urquhart, J. S. ; Thompson, M. A. ; Menten, K. M. ; Wyrowski, F., 2021, & The SEDIGISM Team, A&A, **Under Review**; "*The SEDIGISM survey: a search for molecular outflows*";
6. **A. Y. Yang**; Urquhart, J. S. ; Thompson, M. A. ; Menten, K. M. ; Wyrowski, F. ; Brunthaler, A. ; Tian, W. W. ; Rugel, M. ; Yang, X. L. ; Yao, S. ; Mutale, M., 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**; Thompson M. A.; 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**; Thompson M. A.; Urquhart J.S.; 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; Menten, K. M.; ..., **A. Y. Yang**; , 2021, & The SEDIGISM Team; A&A, Submitted.; "*The SEDIGISM survey: Connection between cloud morphology and integrated properties*";
14. K. R. Neralwar; Menten, K. M.; ...; **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. Urquhart, J. S.; ...; Menten, K. M.; ..., **A. Y. Yang**, 2021, MNRAS, Under Review; "*ATLASGAL – Evolutionary trends in high-mass star formation*";
10. D. Colombo; Menten, K. M.; ..., **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. Brunthaler, A.; Menten, K. M.; ..., **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* $28° < \ell < 36°$ "; arXiv:2106.00377
8. Dokara, Rohit., Menten, K. M. ,..., **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.; Menten, K. M. ;..., **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. Nguyen, H., Menten, K. M.,..., **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. Bai, X.; ...; **A. Y. Yang** et al., 2019, "*The Large High Altitude Air Shower Observatory (LHAASO) Science White Paper*"; arXiv:1905.02773
2. Shan, S. S.; Zhu, H.; Tian, W. W.; Zhang, M. F.; Zhang, H. Y.; Wu, D.; **A. Y. Yang**; 2019, ApJS, 236, 35S; "*Distances of Galactic Supernova Remnants Using Red Clump Stars*"; arXiv:1810.06014
1. Thompson M. A.; ...; **A. Y. Yang**; 2016; "*MeerGAL: the MeerKAT Galactic Plane Survey*"

Proposals — Total: 1147.9 h

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

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

15. PI: **Aiyuan Yang, Approved**, CoI: F. Wyrowski, K. M. Menten et al., ID: VLA/21B-131, 2021, B-config, 2 h;
14. PI: **Aiyuan Yang, Approved**, Effelsberg ID: 19-21, 2021, 20.6 h;
13. PI: **Aiyuan Yang, Submitted**, Effelsberg ID: 101-21, 2021, 62 h;
12. PI: **Aiyuan Yang, Approved**, CoI: J. S. Urquhart, ID: VLA/22A-297, Aug. 2021, A-config. 12 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, A-config, 13 h;
7. PI: **Aiyuan Yang, Observed**, CoI: M. A. Thompson, W. W. Tian, ID: VLA/19B-041, Feb. 2019, C-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: VLA18B-064, Feb. 2018, A-config, 4.5 h;
4. PI: **Aiyuan Yang, Observed**, CoI: M. A. Thompson, W. W. Tian, ID: VLA/18B-063, Feb. 2018, A-config, 13 h;
3. PI: **Aiyuan Yang, Observed**, CoI: M. A. Thompson, W. W. Tian, ID: VLA/19B-041, Feb. 2018, C-config, 4.5 h;
2. PI: **Aiyuan Yang, Observed**, CoI: M. A. Thompson, W. W. Tian, ID: VLA18A-066, 2018, C-config, 13.5 h;
1. PI: **Aiyuan Yang, Observed**, CoI: M. A. Thompson, W. W. Tian, ID: VLA17A-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, AEGEAN, 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)
- Outstanding student at NAOC (2014-2016)
- 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

- Workshop 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 2th 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

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