

# Junhao Liu

East Asian Observatory  
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## Research Interests

- Magnetic fields and dust polarization in star-forming regions at different scales.
- Initial condition of star formation in infrared dark clouds and starless cores.
- Jets and outflows associated with star formation activities.

## Employment

2021.06 - **EAO Fellow (post-doctoral)**, East Asian Observatory (EAO), Hilo, Hawaii, USA.  
2023.07

## Research Experience

2018.08 - **Pre-doctoral Fellow**, Center for Astrophysics | Harvard & Smithsonian, Cambridge, Massachusetts, USA. Supervisor: Dr. Qizhou Zhang.  
2021.05

## Education

2015.09 - **Ph.D. in Astronomy**, School of Astronomy & Space Science, Nanjing University, Nanjing, Jiangsu, P.R. China. Supervisor: Prof. Keping Qiu.  
2021.03  
2011.09 - **B.S. in Astronomy**, School of Astronomy & Space Science, Nanjing University, Nanjing, Jiangsu, P.R. China.  
2015.06

## Technical Skills

Skilled Python  
Working Experience CASA, STARLINK, IDL/MIR, MIRIAD, POLARIS, RADEX, GILDAS

## Approved PI Proposals

- 2022 JCMT 2022B: M22BP047; continuation; Tier 1; 15.2 hours allocated. "Dust polarization survey of massive dense cores in Cygnus-X"
- 2022 JCMT DDT: M22AD003; 16 hours allocated. "A dust polarization survey of IRDCs"
- 2021 SMA 2021A: 2021A-S008; 3 B tracks allocated and a half-track observed. "A pilot dust polarization survey of massive dense cores in Cygnus-X"
- 2021 ALMA Cycle 8: 2021.1.01083; Grade-C; 16.1 hours allocated and 50 mins observed. "A dust polarization survey of massive dense clumps in IRDCs"
- 2021 JCMT 2022A: M22AP018; Tier 1; 11 hours allocated and 10 hrs observed. "Are sub-virial clumps in IRDC G28.34 supported by magnetic fields?"
- 2021 JCMT 2022A: M22AP019; continuation; Tier 1; 19 hours allocated and successfully observed. "Dust polarization survey of massive dense cores in Cygnus-X"
- 2019 JCMT 2020A: M20AP048; continuation; Tier 1; 12 hours allocated and successfully observed. "Dust polarization survey of massive dense cores in Cygnus-X"

- 2019 JCMT 2019B: M19BP037; re-submission; Tier 1; 4.6 hours allocated and successfully observed. "Dust polarization survey of massive dense cores in Cygnus-X"
- 2018 JCMT 2018B: M18BP047; Tier 2; 10 hours allocated and 7 hours observed. "Dust polarization survey of massive dense cores in Cygnus-X"

## Participated Large programs

- 2016-present JCMT large program. PI: Derek Ward-Thompson; "B-Fields in STar-Forming Region Observations (BISTRO)"

## Grants

- 2021-2023 EAO Fellowship. Research funds 5000 USD per year.

## Observation Experience

- 2018.02 Tianma-65m on-site observation. 5 days. Shanghai, China
- 2017.09 JCMT on-site observation. 7 nights. Mauna Kea, HI, US
- 2015.06 CSO remote observation. 5 days.

## Academic Activities

- 2022.02 Invited Talk. "Calibration and reduction of MM/Sub-MM polarization data - using JCMT, SMA, and ALMA as examples". Shanghai Astronomical Observatory star formation group, Remote
- 2021.07 Seminar Talk. "Magnetic fields in early stages of star formation revealed by dust polarization observations". EAO Science Seminar, Remote
- 2021.06 Conference Talk. "Calibrating the DCF method with numerical simulations". SOFIA/JCMT Magnetic Fields and the Structure of the Filamentary Interstellar Medium Online Workshop, Remote
- 2021.03 Flash Talk. "Calibrating the DCF method with numerical simulations". IAU Symposium 360 Astronomical Polarimetry 2020, Remote
- 2019.11 Flash Talk. "ALMA Insight into Magnetic Fields In IRDC G28.34+0.06 & Test DCF method with simulations of massive star formation". Harvard-Heidelberg Workshop on Star Formation in Cambridge, USA
- 2019.05 Poster Talk. "ALMA Insight into Magnetic Fields In IRDC G28.34+0.06". Workshop on Polarization in Protoplanetary Disks and Jets in San Cugat, Spain
- 2018.08 Conference Talk. "Magnetic fields in Ophiuchus C". Molecular Clouds and Star Formation Colloquium in Lhasa, China
- 2017.11 Conference Talk. "An Isothermal Outflow in High-mass Star-forming Region G240.31+0.07". Molecular Clouds and Star Formation Colloquium in Yichang, China
- 2017.08 Conference Talk. "First results of BISTRO: Ophiuchus C". Chinese Astronomical Society Meeting in Urumqi, China

## Services

- Reviewer of JCMT and ALMA proposals.
- 2022 Co-organizer of the JCMT 2022 Users Meeting.
- 2021-present EAO science seminar organizer.

- 2021-present EAO fellow's JCMT-related duties: technical assessment of submitted proposals, data quality check, monitoring the performance of heterodyne instruments, user support, code maintenance for the large-program prediction model, updating the JCMT publication tracking database.
- 2019-2020 Co-mentor of two short-term visiting students at CfA.

## Publications ( [ADS link](#) )

### First-Author Papers

- 2022 "Magnetic Fields in Star Formation: A Complete Compilation of All the DCF Estimations", **Liu, J.**; Qiu, K.; and Zhang, Q.; ApJ, 925, 30
- 2021 "Calibrating the Davis-Chandrasekhar-Fermi Method with Numerical Simulations: Uncertainties in Estimating the Magnetic Field Strength from Statistics of Field Orientations", **Liu, J.**; Zhang, Q.; Commercon, B.; Valdivia, V.; Maury A.; and Qiu, K.; ApJ, 919, 79
- 2020 "Magnetic Fields in the Early Stages of Massive Star Formation as Revealed by ALMA ", **Liu, J.**; Zhang, Q.; Qiu, K.; and 5 coauthors, ApJ, 895, 142
- 2019 "The JCMT BISTRO Survey: The Magnetic Field in the Starless Core  $\rho$  Ophiuchus C", **Liu, J.**; Qiu, K.; and 129 coauthors, ApJ, 877, 43
- 2018 "An Isothermal Outflow in High-mass Star-forming Region G240.31+0.07", **Liu, J.**; Qiu, K.; Wyrowski, F.; Menten, K.; Güsten, R.; Cao, Y.; and Wang, Y.; ApJ, 860, 106

### Co-Author Papers

- 2022 "Surveys of Clumps, Cores, and Condensations in Cygnus X. II. Radio Properties of Massive Dense Cores", Wang, Y.; Qiu, K.; Cao, Y.; Cheng, Y.; **Liu, J.**; and Hu B., ApJ, 927, 185
- 2021 "Does the Magnetic Field Suppress Fragmentation in Massive Dense Cores?", Palau, A.; Zhang, Q.; Girart, J.; **Liu, J.**; and 14 co-authors, ApJ, 912, 159
- 2021 "DR 21 South Filament: A Parsec-sized Dense Gas Accretion Flow onto the DR 21 Massive Young Cluster", Hu, B.; Qiu, K.; Cao, Y.; **Liu, J.**; Wang, Y.; Li, G.; Shen, Z.; Li, J.; Wang, J.; Li, B.; and Dong, J., ApJ, 908, 70
- 2019 "Magnetic fields in the infrared dark cloud G34.43+0.24", Soam, A.; Liu, T.; Andersson, B.; Lee, C.; **Liu, J.**; and 9 co-authors, ApJ, 883, 1
- 2019 "Surveys of Clumps, Cores, and Condensations in Cygnus X. I. A New Catalog of  $\sim 0.1$  pc Massive Dense Cores", Cao, Y.; Qiu, K.; Zhang, Q.; Wang, Y.; Hu, B.; and **Liu, J.**, ApJS, 241, 1

### (Large-Program Co-Author Papers)

- 2022 "B-fields in Star-forming Region Observations (BISTRO): Magnetic Fields in the Filamentary Structures of Serpens Main", Kwon, W.; and 151 co-authors including **Liu, J.**, ApJ, 926, 123
- 2021 "The JCMT BISTRO Survey: An 850/450  $\mu$ m Polarization Study of NGC 2071IR in Orion B", Lyo, A.; and 149 co-authors including **Liu, J.**, ApJ, 918, 85
- 2021 "The JCMT BISTRO Survey: Revealing the Diverse Magnetic Field Morphologies in Taurus Dense Cores with Sensitive Submillimeter Polarimetry", Eswaraiah, C.; and 144 co-authors including **Liu, J.**, ApJ, 912, L27
- 2021 "Observations of Magnetic Fields Surrounding LkH $\alpha$  101 Taken by the BISTRO Survey with JCMT-POL-2", Ngoc, N., and 148 co-authors including **Liu, J.**, ApJ, 908, 10
- 2020 "The JCMT BISTRO Survey: Magnetic Fields Associated with a Network of Filaments in NGC 1333", Doi, Y., and 137 co-authors including **Liu, J.**, ApJ, 899, 28
- 2019 "The JCMT BISTRO Survey: The Magnetic Field of the Barnard 1 Star-forming Region", Coude, S., and 121 coauthors including **Liu, J.**, ApJ, 877, 88

- 2019 "JCMT BISTRO Survey: Magnetic Fields within the Hub-filament Structure in IC 5146", Wang, J., and 132 coauthors including **Liu, J.**, ApJ, 876, 42
- 2018 "Magnetic Fields toward Ophiuchus-B Derived from SCUBA-2 Polarization Measurements", Soam, A., and 123 coauthors including **Liu, J.**, ApJ, 861, 65
- 2018 "A First Look at BISTRO Observations of the  $\rho$  Oph-A core", Kwon, J., and 121 coauthors including **Liu, J.**, ApJ, 859, 4
- 2017 "First Results from BISTRO: A SCUBA-2 Polarimeter Survey of the Gould Belt", Ward-Thompson, D., and 113 coauthors including **Liu, J.**, 2017, ApJ, 842, 66