Xihe Liu

+86 15330630302 • foisliu1054@gmail.com • github.com/foisliu • foisliu.github.io/resume/ • Santiago, 8320000, Chile

Education

Shandong University | ***Undergrad in Department of Physics, Class of 2025 (GPA : Top 35%)*** 09/2021 - Present

- Coursework – **Math** (Advanced Mathematics, Methods of Mathematical Physics, Probability and Mathematical Statistics, Linear Algebra, etc..), **Physics** (Thermal Physics, Optics, Theoretical Mechanics, Electrodynamics, Quantum mechanics, Computational Physics, etc..), **Chemistry** (College Chemisrty)

Research Interest

Observation (Sub) Millimeter Radio Astronomy - ISM & Star Formation Using Continuum and Molecular Lines (ALMA, SMA, etc..)

Simulation The Magnetic Field of Star Formation Region

Research Experience

Department of Astronomy, Universidad de Chile | ***Advisor: Prof. Guido Garay*** 03/2024 - Present

- **Research Assistant**: **"ALMA Three-millimeter Observations of Massive Star-forming Regions (ATOMS) - Hub-Filament Systems of ATOMS Sources IRAS 13484-6100"**
  - Use findfil package to identify the filament structures in IRAS 13484-6100, and find this source have HFSs
  - Draw moment 0&1&2 maps, channel maps and grid maps about $H_{13}CO^+$, HCO^+, SiO, SO, CH_3OH, etc.. to study the gas inflow along filament structures and central high velocity outflows
  - Draw P-V diagrams of SiO and SO to identify the exactly position and velocity of outflows
  - Plot the rotational temperature diagram of CH_3OH to calculate the temperature of the source center where fit with LTE model

Shanghai Astronomical Observatory, Chinese Academy of Sciences | ***Advisor: Prof. Pakshing Li*** 11/2023 - 01/2024

- **Research Assistant**: **"A New Calibration Using Data from a Large-scale, High-resolution Simulation Using ORION2 on the Formation of Filamentary Dark Clouds"**
  - Use Vislt software to analyse the simulation data from ORION2 to identify the region of filamentary dark clouds, then write a Matlab script to calculate the magnetic field strength of these regions by DCF function
  - Calculate the magnetic field strength directly from ORION2 simulation data, then rewrite the DCF function by comparing B field got from these two methods

Shanghai Astronomical Observatory, Chinese Academy of Sciences | ***Advisor: Dr. Xing Lu*** 09/2022 - 09/2024

- **Research Assistant**: **"Analysis of Dense Cores and Filamentary Structures within the CMZ Cloud e Using ALMA Band 3 & 6"**
  - Use both CASA pipeline and by hand to process raw data from ALMA Science Archive (flagging, calibration, tclean, etc..)
  - Write script to identify cores in Sgr B1-off from both band 3 & 6 using ASTRODENDRO package
  - Calculate spectral index both by pixel and by each cores, and find 40 cores in Sgr B1-off have optically-thin emission that can be identified as "dense cores"
  - Use isothermal cylindrical model to find the fragmented filamentary structure in Sgr B1-off, and use findfil package to identify the former filamentary structures
  - Calculate the mass of the dense cores and use MST model to calculate the distance between them, and find this IRDC clump is in early evolution stage and has not yet undergone dynamical relaxation leading to dissolution over time. We also find the evidence of "primordial mass segregation" in Sgr B1-off.

Publication

Liu, X.-H., Lu, X., Xu, F.-W., et al., "Dual-band Unified Exploration of Three CMZ clouds (DUET) – the 3 mm and 1.3 mm Continuum Emission and Dense Cores in the Dust Ridge cloud e" in prep.,2024,

Skills

Language Python (Astropy, Aplpy, Matplotlib, Pandas, Spectral Cube), C, MATLAB

Software & Programming CASA, CARTA, DS9, Vislt, VS Code, Mathematica, ORION2, CASSIS

English CET4, CET6, ITLS

Conferences and Presentations

The 9th China SKA Summer School 09/2024

ALMA-ATOMS/QUARKS workshop 08/2024

Oral Presentation (ALMA-ATOMS IRAS13484 source: Gas Inflow along HFSs and Outflows in Hub-Filament Systems) *Shanghai, China*

244th Meeting of the American Astronomical Society 06/2024
Poster (ALMA-ATOMS IRAS13484 source: Gas Inflow along HFSs and Outflows) *Madsion, WI, USA*

SOKENDAI/NAOJ Asian Winter School 2024 02/2024

2023 Annual Symposium on Molecular Clouds and Star Formation 10/2023
Poster (DUET: The Band3 and Band6 Continuum Emission and Dense Cores in the Dust Ridge Cloud 'e') *Chongqing, China*

2023 Peking University Undergraduate Astronomy Symposium 09/2023
Oral Presentation (Analysis of Dense Cores and Filamentary Structures within CMZ cloud 'e' using ALMA Band 3 & 6) *Beijing, China*

2023 Annual Meeting of the Chinese Astronomical Society 09/2023
Participate without Report *Weihai, China*

2023 Submillimeter Array Interferometry School 05/2023

SOFIA School 2023 04/2023

The 7th China SKA Summer School 09/2022

Honors and Awards

Linbridge Scholarship 2023 Peking University Undergraduate Astronomy Symposium

First Prize Contemporary Undergraduate Mathematical Contest in Modeling

Third Prize Chinese undergraduate Astronomical Innovation Contest

Community Involvement

1 | *Lead of Chinese Undergrad Astrophysics Community* 2022 - Present

- Establish the First Chinese National Astronomical Academic Community (similar to Astrobites) Specifically Designed for Undergraduate Students

2 | *Host of "Astrophysics Party"* 2022 - Present

- Host a Seminar and Invite Professors from Different Chinese Astronomy Department to Give Talk for Undergraduate Students every Week

3 | *Astronomy Science Popularization Volunteer, Shandong University* 2021–2022

- Lead of Teaching Astronomy Popular Science Lesson to the Students of Primary School

4 | *One of the Leaders of Shandong University Astronomy Club* 2021 - Present

- Organize Nighttime Astronomical Observation Activities on Campus for All Students in Shandong University