Xing "Walker" Lu

ALMA Project Post-doctoral Fellow

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Research Interests

- Star formation in the Central Molecular Zone of the Galaxy.
- Gas accretion in high-mass star forming filamentary clouds.

Education

Sep. 2010–Jun. 2016	Ph.D. in Astronomy, School of Astronomy & Space Science, Nanjing University.
Advisors	Drs. Qizhou Zhang and Qiusheng Gu
Thesis	Interferometric Observations of Dense Cores in High-mass Star Forming Regions
Sep. 2006–Jun. 2010	B.S. in Physics, Kuang Yaming Honor School, Nanjing University.

Professional Experience

_____	Referee of the journal Research in Astronomy and Astrophysics.
Mar. 2018–Present	One of the two founders and organisers of the Star Formation Weekly Meeting at NAOJ.
Nov. 2017	Astronomer on Duty at the ALMA Operations Support Facility, Chile. Operated ALMA, scheduled projects, and conducted various tests during two shifts (two weeks).
Jun. 2017	Technical secretary for the ALMA Cycle 5 proposal review meeting. Served the review panel, and helped answering technical questions on ALMA from reviewers.
Aug. 2016–Present	ALMA project post-doctoral fellow at NAOJ, with duties related to the ALMA operation, including data reduction, user support (observing script generation, helpdesk), and support of workshops.
Mar. 2012–Aug. 2015	The Submillimeter Array (SMA) pre-doctoral fellow at Harvard-Smithsonian Center for Astrophysics (advisor: Dr. Qizhou Zhang).
May 2011–Present	Administrator and contributor of *Astroleaks*, an on-line platform for professional discussion and experience-sharing. Contributed 12 articles covering topics such as solar physics and data visualization.

Mar. 2010–Jun. 2010	Undergraduate research intern at Nanjing University (advisor: Dr. Yang Chen), data reduction and analysis of the CO(1–0) observations taken with the KOSMA telescope towards the supernova remnant W41.
Sep. 2009–Feb. 2010	Associate editor of *College Natural Science*, a nation-wide student-managed undergraduate science journal.

Teaching/Mentoring and Outreach

Aug. 2018	Volunteer of the Nobeyama Radio Observatory Public Open Day.
Oct. 2016/2017/2018	Volunteer of the National Astronomical Observatory of Japan Public Open Day.
Aug. 2017–Oct. 2017	Host of visiting student Mengyuan Xiao (first-year PhD student from Nanjing University) at NAOJ. Taught basics of interferometry and worked together on the calibration and imaging of ALMA data of a high-redshift protocluster.
Jun. 2013–Aug. 2015	Mentors of summer interns at Harvard-Smithsonian Center for Astrophysics. Worked with 4 interns from colleges and high schools to develop short-term research projects from interferometric imaging to Python programming.
Sep. 2011–Jan. 2012	Teaching assistant for undergraduate course *Observational Astronomy* at Nanjing University (professor: Dr. Junzhi Wang).

Professional Skills

- Mastered in Python and IDL.
- Text editing with LaTeX, web design with HTML/CSS/Javascript.

Successful PI Observation Proposals

ALMA

2018	"Evidence of accretion disks during the formation of high-mass stars in the Central Molecular Zone" (Grade A).
2018	"Are they low-mass protostars? A census of hundreds of compact sources in the Central Molecular Zone" (Grade A).
2018	"Gas accretion into dense cores from early to late evolutionary phases of massive filamentary clouds" (re-submission).
2017	"Where and when do low-mass stars form in high-mass protoclusters?".
2017	"Gas accretion into dense cores from early to late evolutionary phases of massive filamentary clouds".
2017	"Confirming Deeply Embedded Protostellar Population in the Central Molecular Zone"(re-submission).

VLA

2018	"Is Active Star Formation Emerging in the Central Molecular Zone?".
2016	"Progressive Star Formation of the Orbit in the Central Molecular Zone".

SMA

2018	"Gas Accretion toward Dense Cores in High-mass Star Forming Filaments".
2016	"Understanding Formation of Low-mass Stars in Clusters with Observations of Hubs".
2015	"High-mass Star Formation in Dense Cores Embedded in Filaments".
2015	"Deeply Embedded Protostars in the Central Molecular Zone".
2014	"Massive Star Formation in Progress in Filamentary Clouds".
2013	"Sgr B2: A Star-forming Cloud in the Central Molecular Zone".
2013	"Gas Kinematics in Filamentary Infrared Dark Clouds".
2013	"High-mass Clouds in the Central Molecular Zone".
2012	"Gas Kinematics and Condensations in Filamentary Infrared Dark Clouds".

JCMT

2018	"Are supercritical filaments supported by magnetic fields?".
2017	"A Rigorous Survey of Gas Accretion in High-mass Star Forming Filamentary Clouds".

ASTE

2017	"Densities of Massive Molecular Clouds in the Central Molecular Zone with N_2H^+ Lines".

IRAM 30m

2014	"Filamentary Structure, Infall Convergent Flow and Massive Star Formation".

Participated Large Scale Projects

2017–2018	ALMA, PI: F. Motte, "ALMA-IMF: ALMA transforms our view of the origin of stellar masses".
2014–2017	SMA, PIs: C. Battersby & E. Keto, "CMZoom: The SMA Legacy Survey of the Central Molecular Zone".
2015–2017	The Submillimeter Telescope (SMT), PI: K. Wang, "ESO-ARO Public Survey on Planck All-Sky Cold Clumps".

Observing Experience

Nov. 2017	ALMA, on-site observing, 14 nights, San Pedro, Chile.
Jul. 2017	ASTE, remote observing, 10 nights, Mitaka, Japan.
Jan. 2016	SMT, remote observing, 3 nights, Nanjing, China.

Nov. 2015	SMT, remote observing, 2 nights, Nanjing, China.
Sep. 2014	SMA, on-site observing, 5 nights, Mauna Kea, HI, USA.
Apr. 2014	Caltech Submillimeter Obervatory (CSO), remote observing, 3 nights, Cambridge, MA, USA.
Jun. 2012	Combined Array for Research in Millimeter-wave Astronomy (CARMA), on-site observing during CARMA summer school, 2 nights, Big Pine, CA, USA.
May 2012	SMA, on-site observing, 5 nights, Mauna Kea, HI, USA.
Jan. 2012	DLH 13.7m telescope, on-site observing, 5 nights, Delingha, Qinghai, China.

Honors and Grants

2017	JSPS Grant-in-Aid for Early-Career Scientists (KAKENHI), 910,000 JPY (∼8,200 USD) for two years.
2017	Outstanding Doctoral Thesis Prize of Jiangsu Province, China.
2016	Excellent Projects of Program A for outstanding PhD candidates of Nanjing University, 10,000 CNY (∼1,500 USD).
2016	IAU Travel Grants, 700 EUR (∼800 USD).
2015	Program A for outstanding PhD candidates of Nanjing University, 80,000 CNY (∼12,000 USD).
2015	Nanjing University outstanding graduate students scholarship, 1,000 CNY (∼150 USD).
2012	The SMA pre-doctoral fellowship, ∼30,000 USD per year for three years.
2011	Nanjing University Zhengzhiwei enterprise scholarship.
2009	Nanjing University social activity scholarship, second prize.
2008	Nanjing University people's scholarship, second prize.
2007	Nanjing University people's scholarship, second prize.

List of Publications

First-authored Publications

5. "Filamentary Fragmentation and Accretion in High-mass Star-forming Molecular Clouds", **Lu, X.**, Zhang, Q., Liu, H. B., Sanhueza, P., Tatematsu, K., Feng, S., Smith, H. A., Myers, P. C., Sridharan, T. K., & Gu, Q. 2018, ApJ, 855, 9.
4. "The Molecular Gas Environment in the 20 km s^{-1} Cloud in the Central Molecular Zone",
Lu, X., Zhang, Q., Kauffmann, J., Pillai, T., Longmore, S. N., Kruijssen, J. M. D., Battersby, C., Liu, H. B., Ginsburg, A., Mills, E. A. C., Zhang, Z.-Y., & Gu, Q. 2017, ApJ, 839, 1.
3. "Deeply Embedded Protostellar Population in the 20 km s^{-1} Cloud of the Central Molecular Zone",
Lu, X., Zhang, Q., Kauffmann, J., Pillai, T., Longmore, S. N., Kruijssen, J. M. D., Battersby, C., & Gu, Q. 2015, ApJL, 814, L18.
2. "Initial Fragmentation in the Infrared Dark Cloud G28.53-0.25",
Lu, X., Zhang, Q., Wang, K., & Gu, Q. 2015, ApJ, 805, 171.
1. "VLA Observations of Ammonia in High-mass Star Formation Regions",
Lu, X., Zhang, Q., Liu, H. B., Wang, J., & Gu, Q. 2014, ApJ, 790, 84.

Co-authored Publications

9. "SMA Observations of Extended CO (J=2–1) Emission in Interacting Galaxy NGC 3627", Law, C. J., Zhang, Q., Ricci, L., Petitpas, G., Jiménez-Donaire, M. J., Ueda, J., **Lu, X.**, & Dunham, M. M. 2018, ApJ accepted.
8. "Distributed Star Formation throughout the Galactic Center Cloud Sgr B2",
Ginsburg, A., Bally, J., Barnes, A., Bastian, N., Battersby, C., Beuther, H., Brogan, C., Contreras, Y., Corby, J., Darling, J., & 17 co-authors including **Lu, X.** 2018, ApJ, 853, 171.
7. "First Data Release of the ESO-ARO Public Survey SAMPLING—SMT All-sky Mapping of Planck Interstellar Nebulae in the Galaxy",
Wang, K., Zahorecz, S., Cunningham, M. R., Tóth, L. V., Liu, T., **Lu, X.**, Wang, Y., Cosentino, G., Sung, R.-S., Sokolov, V., & 10 co-authors 2018, RNAAS, 2, 2.
6. "Star formation in a high-pressure environment: an SMA view of the Galactic Centre dust ridge",
Walker, D. L., Longmore, S. N., Zhang, Q., Battersby, C., Keto, E., Kruijssen, J. M. D., Ginsburg, A., **Lu, X.**, Henshaw, J. D., Kauffmann, J., & 7 co-authors 2018, MNRAS, 474, 2373.
5. "SMA Observations of the Hot Molecular Core IRAS 18566+0408",
Silva, A., Zhang, Q., Sanhueza, P., **Lu, X.**, Beltran, M. T., Fallscheer, C., Beuther, H., Sridharan, T. K., & Cesaroni, R. 2017, ApJ, 847, 87.
4. "The Galactic Center Molecular Cloud Survey. I. A steep linewidth-size relation and suppression of star formation",

Kauffmann, J., Pillai, T., Zhang, Q., Menten, K. M., Goldsmith, P. F., **Lu, X.**, & Guzmán, A. E. 2017, A&A, 603, A89.

3. "The Galactic Center Molecular Cloud Survey. II. A lack of dense gas and cloud evolution along Galactic center orbits",
Kauffmann, J., Pillai, T., Zhang, Q., Menten, K. M., Goldsmith, P. F., **Lu, X.**, Guzmán, A. E., & Schmiedeke, A. 2017, A&A, 603, A90.
2. "A Massive Prestellar Clump Hosting No High-mass Cores",
Sanhueza, P., Jackson, J. M., Zhang, Q., Guzmán, A. E., **Lu, X.**, Stephens, I. W., Wang, K., & Tatematsu, K. 2017, ApJ, 841, 97.
1. "Fragmentation of Molecular Clumps and Formation of Protocluster",
Zhang, Q., Wang, K., **Lu, X.**, & Jiménez-Serra, I. 2015, ApJ, 804, 141.

Conference Contributions

17. Talk, "Deeply Embedded Star Formation in Massive Clouds in the Central Molecular Zone",
Lu, X., Zhang, Q., Kauffmann, J., Pillai, T., Longmore, S. N., Kruijssen, J. M. D., Battersby, C., Mills, E. A. C., Ginsburg, A., Liu, H. B. 2018, Tracing the Flow: Galactic Environments and the Formation of Massive Stars.
16. Poster, "Gas Accretion in High-mass Star Forming Filaments",
Lu, X., Zhang, Q., Sanhueza, P., Liu, H. B., Feng, S., Wang, K., Tatematsu, K. 2018, Tracing the Flow: Galactic Environments and the Formation of Massive Stars.
15. Poster, "Gas Accretion in High-mass Star Forming Filaments",
Lu, X., Zhang, Q., Sanhueza, P., Liu, H. B., Feng, S., Wang, K., Tatematsu, K. 2018, NAOJ NOEMA/30m Workshop.
14. Invited talk, "From Filaments to the Central Molecular Zone: Understanding Star Formation in the Galaxy",
Lu, X. 2018, Nanjing University Youth Scholar Frontier Forum.
13. Colloquium talk, "Deeply Embedded Star Formation in Massive Clouds in the Central Molecular Zone",
Lu, X. 2018, Weekly Colloquium at the Shanghai Astronomical Observatory.
12. Colloquium talk, "Deeply Embedded Star Formation in Massive Clouds in the Central Molecular Zone",
Lu, X. 2018, Weekly Colloquium at the National Astronomical Observatory of China.
11. Colloquium talk, "The molecular environment of star formation in the Central Molecular Zone",
Lu, X. 2017, Weekly Colloquium at the China-Chile Joint Center for Astronomy.
10. Talk, "The molecular environment of star formation in the CMZ",
Lu, X., Zhang, Q., Kauffmann, J., Pillai, T., Longmore, S. N., Kruijssen, J. M. D., Battersby, C. 2017, Star Formation in Different Environments 2017 (SFDE17): From Local Clouds to Distant Galaxies.
9. Colloquium talk, "Fragmentation and Accretion in High-mass Star Forming Filamentary Clouds",

Lu, X. 2017, Weekly Colloquium at the Purple Mountain Observatory.

8. Talk, "Deeply Embedded Star Formation in the Central Molecular Zone",
Lu, X., Zhang, Q., Kauffmann, J., Pillai, T., Longmore, S. N., Kruijssen, J. M. D., Battersby, C. 2017, East-Asian ALMA Science Workshop 2016.
7. Talk, "Deeply Embedded Protostellar Population in the Central Molecular Zone Suggested by H_2O Masers and Dense Cores",
Lu, X., Zhang, Q., Kauffmann, J., Pillai, T., Longmore, S. N., Kruijssen, J. M. D., Battersby, C. 2016, International Astronomical Union Symposium 322: The Multi-Messenger Astrophysics of the Galactic Centre.
6. Intro talk & poster, "An SMA/VLA Mini-survey of Six Massive CMZ Clouds: Searching for 'Hidden' Protostellar Population",
Lu, X., Zhang, Q., Kauffmann, J., & Pillai, T. 2015, Harvard-Heidelberg Star Formation Workshops.
5. Talk, "SMA and VLA Observations of Dense Cores at Different Evolutionary Phases in Filamentary IRDCs",
Lu, X. & Zhang, Q. 2014, Workshop on Dense Cores: Origin, Evolution, and Collapse, AAS Topical Conference Series.
4. Talk, "Molecular Spectral Lines in Filamentary Infrared Dark Clouds",
Lu, X., Zhang, Q., & Liu, H. B. 2014, 69th International Symposium on Molecular Spectroscopy.
3. Poster, "Revealing Initial Conditions of High-mass Star Formation in IRDCs with the SMA",
Lu, X., Zhang, Q., & Liu, H. B. 2014, The Submillimeter Array: First Decade of Discovery.
2. Talk, "Gas Kinematics in Filamentary Infrared Dark Clouds",
Lu, X., Zhang, Q., & Liu, H. B. 2014, American Astronomical Society Meeting #224.
1. Poster, "SMA Observations towards Massive Clouds in the Central Molecular Zone",
Lu, X., Zhang, Q., Kauffmann, J., & Pillai, T. 2013, International Astronomical Union Symposium 303: The Galactic Center: Feeding and feedback in a normal galactic nucleus.