

Curriculum Vitae: Jiaru Li

Cornell University
Department of Astronomy
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Education

Jun 2023 (est.)	Ph.D., Cornell University (Astronomy)
Dec 2019	M.S., Cornell University (Astronomy)
May 2017	H.B.Sc., University of Toronto at Scarborough (Physics Specialist, Mathematics Major)

Publications

See the “List of All Publications” appended at the end or see the [list](#) in the SAO/NASA Astrophysics Data System.

Research Experience

- **Eccentricity Exchange between Planets and Protoplanetary disks**
Advisor: Prof. Dong Lai (Cornell University) 2022 - present
- **Formation and Evolution of Black Hole Binaries in Active Galactic Nucleus Disks**
Advisor: Dr. Hui Li (Los Alamos National Laboratory) 2020 - present
Collaborators: Dr. Adam M. Dempsey, Dr. Shengtai Li and Dr. Ya-Ping Li
- **Eccentric Protoplanetary Disks: Linear Mode, Hydrodynamics Simulations, and Ring Formation**
Advisor: Dr. Hui Li (Los Alamos National Laboratory) 2020 - present
Collaborators: Dr. Adam M. Dempsey and Dr. Shengtai Li
- **Dynamical Instability in Multi-Orbiter Systems**
Advisor: Prof. Dong Lai (Cornell University) 2021 - 2022
Collaborators: Dr. Laetitia Rodet
- **Outcomes of Planetary Mergers and Scatterings**
Advisor: Prof. Dong Lai (Cornell University) 2017 - 2020
Collaborators: Dr. Cassandra Anderson and Dr. Bonan Pu

- **Quantum Geometric Phase Effects in Large Molecules**
Advisor: Prof. Artur Izmaylov (University of Toronto) 2015-2017
Collaborator: Dr. Loïc Joubert-Doriol
- **Evolution of Gaseous Disks around Supermassive Black Hole Binaries**
Advisor: Prof. Pawel Artymowicz (University of Toronto) Summer 2016

Selected Honors and Awards

- **Center for Space and Earth Science Student Fellowship**, Los Alamos National Laboratory 2020 - 2022
- **Cornell New Graduate Student Fellowship** 2017
- **Governor General's Silver Medal nomination**, University of Toronto 2017
- **Graduating Prize in the Physical and Environmental Sciences**, University of Toronto at Scarborough 2017
- **Samuel Beatty In-Course Scholarship**, University of Toronto 2017
- **University of Toronto Excellence Award** 2016
- **Academic Excellence and Departmental of Physical and Environmental Sciences Citizenship Award**, University of Toronto at Scarborough 2016
- **E-Fund Scholarship**, University of Toronto at Scarborough 2013 - 2016
- **University of Toronto Scholar** 2014 - 2016
- **Vincent Bladen Scholarship**, University of Toronto at Scarborough 2015
- **A. D. Allen Memorial Scholarship**, University of Toronto at Scarborough 2014

Teaching Experience

- **Our Solar System**, Teaching Assistant, Cornell 2019
- **From New Worlds to Black Holes**, Teaching Assistant, Cornell 2018
- **Quantum Mechanics I**, Grader, Toronto 2017
- **Astrophysics of Stars, Galaxies, and the Universe**, Grader, Toronto 2016
- **Calculus I & II for Math Major**, Teaching Assistant, Toronto 2016 - 2017
- **Physics I & II for Biology Student**, Lab Leader, Toronto 2016 - 2017
- **Linear Algebra II**, Teaching Assistant, Toronto 2016
- **Discrete Math for Computer Scientists**, Teaching Assistant, Toronto 2014 - 2015

Selected Invited and Contributed Presentations

- **Georgia Tech CRA Seminar** Atlanta, GA Oct 2022
Seminar talk: "Formation of Black Hole Binaries in AGN disks through Close Encounters"
- **Los Alamos Astrophysics Seminar** Los Alamos, NM Aug 2022
Seminar talk: "Formation of Black Hole Binaries in AGN disks through Close Encounters"

- **AAS Division on Dynamical Astronomy Meeting** New York, NY Apr 2022
Conference Talk: “*Long-term Evolution of Tightly-Packed Stellar Black Holes in AGN Disks: Formation of Merging Black-Hole Binaries via Close Encounters*”
- **Distorted Astrophysical Discs Workshop at KICC** Cambridge, UK May 2021
Conference Poster: “*Ring Formation in Protoplanetary Discs Driven by an Eccentric Instability*”
- **Symposium on Chemical Physics** Waterloo, ON Nov 2016
Conference Poster: “*Geometric Phase Effects in the Excited State Dynamics of N-Dimensional Linear Vibronic Coupling Model*”
- **(Planned) Recent Advances in Supermassive Black Holes** Ithaca, NY Oct 2022
Workshop Talk: “*Eccentric Black Holes in AGN Disks*”
- **(Planned) Penn State CEHW Seminar** State College, PA Nov 2022
Seminar talk: *exoplanet and protoplanetary disks related topic (TBD)*
- **(Planned) Princeton Extrasolar Planet Discussion** Princeton, NJ Nov 2022
Seminar talk: *exoplanet and protoplanetary disks related topic (TBD)*

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First Author Publications

1. **Li, J.**, Lai, D., and Rodet, L.
Long-term Evolution of Tightly Packed Stellar Black Holes in AGN Disks: Formation of Merging Black Hole Binaries via Close Encounters
The Astrophysical Journal, Volume 934, Issue 2, id. 154 (12 pp.), Aug 2022
2. **Li, J.**, Dempsey, A. M., Li, H., and Li, S.
Ring Formation in Protoplanetary Disks Driven by an Eccentric Instability
The Astrophysical Journal, Volume 910, Issue 1, id. 79 (14 pp.), Mar 2021
3. **Li, J.**, Lai, D., Anderson, K., and Pu, B.
Giant Planet Scatterings and Collisions: Hydrodynamics, Merger-ejection Branching Ratio, and Properties of the Remnants
Monthly Notices of the Royal Astronomical Society, Volume 501, Issue 2, pp. 1621-1632, Feb 2021
4. **Li, J.** and Lai, D.
Planetary Spin and Obliquity from Mergers
The Astrophysical Journal Letters, Volume 898, Issue 1, id. L20 (7 pp.), Jul 2020
5. **Li, J.**, Joubert-Doriol, L., and Izmaylov, A. F.
Geometric Phase Effects in Excited State Dynamics through a Conical Intersection in Large Molecules: N-dimensional Linear Vibronic Coupling Model Study
The Journal of Chemical Physics, Volume 147, Issue 6, id. 064106, Aug 2017

Other Publications

6. Li, Y.-P., Dempsey, A. M., Li, H., Li, S., and **Li, J.**
Hot Circumsingle Disks Drive Binary Black Hole Mergers in Active Galactic Nucleus Disks
The Astrophysical Journal Letters, Volume 928, Issue 2, id. L19 (8 pp.), Apr 2022
7. Li, Y.-P., Dempsey, A. M., Li, S., Li, H., and **Li, J.**
Orbital Evolution of Binary Black Holes in Active Galactic Nucleus Disks: A Disk

Channel for Binary Black Hole Mergers?

The Astrophysical Journal, Volume 911, Issue 2, id. 124 (10 pp.), Apr 2021

8. Izmaylov, A. F., **Li, J.**, and Joubert-Doriol, L.
A Diabatic Definition of Geometric Phase Effects
Journal of Chemical Theory and Computation, Volume 12, pp. 5278-5283, Oct 2016

Work in Progress

9. **Li, J.**, Rodet, L., and Lai, D.
Dynamical Instability in Multi-Orbiter Systems with Gas Friction
Monthly Notices of the Royal Astronomical Society, submitted
10. **Li, J.**, Dempsey, A. M., Li, H., Lai, D., and Li, S.
Formation of Black Hole Binaries in AGN Disks by a Departure Drag
to be submitted soon
11. **Li, J.** and Lai, D.
Planet Eccentricity Excited by a Dispersing Eccentric Protoplanetary Disk
to be submitted soon