Ting Li

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Research Interests

Near-field Cosmology, Galactic Archaeology, Milky Way Kinematics and Stellar Populations, Dwarf Galaxies, Stellar Streams, Metal-poor Stars, Chemical Abundance, Stellar Spectroscopy, Ground-based Instrumentation, Large-area Sky Surveys, Optical/Near-infrared Spectrograph

Research Positions

Hubble Fellow, Carnegie-Princeton Fellow — 2019 –
Carnegie Observatories, Carnegie Institution for Science
Pasadena, California, USA
Department of Astrophysical Sciences, Princeton University
Princeton, New Jersey, USA

Leon M. Lederman Fellow in Experimental Physics — 2016 – 2019
Fermi National Accelerator Laboratory
Batavia, Illinois, USA

Research Associate — 2011 – 2016
Department of Physics & Astronomy, Texas A&M University
College Station, Texas, USA

Research Associate — 2010
Department of Earth & Planetary Science, Tokyo University
Tokyo, Japan

Summer Research Intern — Summer 2009
Swedish Institute of Space Physics
Kiruna, Sweden

Education

Ph.D., Physics, Texas A&M University, Texas, USA — Aug 2016
Thesis: *Exploring Milky Way Halo Substructures with Large-area Sky Surveys*
Advisors: *Dr. Darren L. DePoy, Dr. Jennifer L. Marshall* (Co-chair)

M.S., Space Science and Technology (SpaceMaster – Erasmus Mundus Course) — Aug 2010
Luleå University of Technology, Kiruna, Sweden
Université Paul Sabatier Toulouse III, Toulouse, France
Thesis: *Design of the High Energy Particle Instrument for Electrons for the Energization and Radiation in Geospace Mission*
Advisor: *Masafumi Hirahana, University of Tokyo / JAXA*

B.S., Physics, Fudan University, Shanghai, China — Jun 2008
Thesis: *Study of Quasar Accretion Disk with Microlensing*
Advisor: *Feng Yuan, Shanghai Astronomical Observatory*

Minor, Diplomacy, Fudan University, Shanghai, China — Jun 2008

Honors & Awards

NASA Hubble Fellowship	2019 – 2022
Joint Carnegie-Princeton Fellowship	2019 – 2024
KICP Associate Fellow, University of Chicago	2016 – 2019
Leon M. Lederman Fellow in Experiment Physics	2016 – 2019
Mitchell Institute Graduate Fellowship	2015 – 2016
Dr. Chia-Lai Wang Memorial Scholarship	2013 – 2014
Erasmus Mundus Scholarship	2008 – 2010
Graduated with First - Class Student, Fudan Univeristy	2008
People's Scholarship, Fudan University	2004 – 2008

Teaching and Outreach

Lecturer, Fermilab Lifelong Learning Institute (LLI) Program	2018
Lecturer, Fermilab Saturday Morning Physics for High School Students	2017 – 2019
Coordinator, Fermilab Saturday Morning Physics for High School Students	2016 – 2019
E/PO representative, Dark Energy Survey	2014 – 2016
Mentor, Texas A&M REU Summer Program	Jun – Aug2014
Coordinator, Science Olympiad	May 2014
Instructor, "Expanding Your Horizons" Workshop	Nov 2012
Organizer, Texas A&M Physics and Astronomy Festival	April 2011 – 2014
Organizer, Texas A&M Star Parties	2011 – 2013
Lab instructor, Astronomy 111: Overview of Modern Astronomy	Fall 2011
Teaching Assistant, Astronomy 314: Survey of Astronomy	Fall 2010

Scientific Collaborations

co-PI, Southern Stellar Stream Spectroscopic Survey (S5)	2018 –
Member, Blanco Imaging of the Southern Sky (BLISS)	2017 –
Member, LSST Dark Energy Science Collaboration (DESC)	2016 –
Member, Dark Energy Spectroscopic Instrument (DESI)	2016 –
Member, Magellanic Satellites Survey (MagLiteS)	2016 –
Builder, Dark Energy Survey (DES)	2015 –
Member, Dark Energy Survey (DES)	2012 –

Service and Leadership

Referee, The Astrophysical Journal	
Referee, Monthly Notices of the Royal Astronomical Society	
Referee, Astronomy & Astrophysics	
S5 Leader	2018 –
DES Milky Way Working Group Convener	2018 –
SOC member, Kavli/AURA Workshop "Petabytes to Science"	2018 – 2019
Group Leader, Dark Matter Group for Maunekea Spectroscopic Explorer	2018 –
SOC chair, KICP Workshop "Near-Field Cosmology with DES's DR1"	2018
Co-organizer, Astro Seminar, Fermilab	2018 –
Group Leader, DES Chromatic Correction and Interstellar Reddening Task Force	2017 –
DES Early Career Scientist Committee	2016 – 2018
Community Study Author, "Maximizing Science in the Era of LSST"	2016

Observation, Data Reduction & Instrumentation Experience

Contribution to DES:
- Commissioning and Operation, Photometric Calibration, Data Release
- Designed and built the Atmospheric Transmission Monitoring Camera (aTmCam), including 100+ nights of prototype testing and instrument commissioning
- Earned **DES builder status (authorship)** and **personal data rights** since 2015

Contribution to DESI:
- Adaptive Optics System for Commissioning, Science Verification Coordinator for Milky Way Survey

Extensive observing experience:
- Optical imaging: CTIO, Blanco(4m)/DECam (DES/DECaLS, 70+ nights); KPNO, Mayall(4m)/Mosaic3 (MzLS, 4 nights)
- Optical spectroscopy: LCO, Magellan(6.5m)/IMACS (30+ nights), Magellan(6.5m)/MIKE (5 nights); McDonald Observatory, 2.1m/ES2 (30+ nights), 2.7m/VIRUS-P (9 nights)

Experience with analysis and reduction:
- High resolution spectroscopy: HET(9.4m)/HRS, VLT(8.2m)/UVES, Magellan(6.5m)/MIKE
- Multi-object spectroscopy: Magellan(6.5m)/IMACS, VLT(8.2m)/GIRAFFE, AAT(4m)/AAOmega

Assembled over 80 Instrument Collimators of the Visible Integral-Field Replicable Unit Spectrographs for the Hobby-Eberly Telescope Dark Energy Experiment (HETDEX)

Designed a web-based Exposure Time Calculator for GMACS (an optical multi-object spectrograph) for the Giant Magellan Telescope:
- `http://instrumentation.tamu.edu/cgi-bin/gmacs.cgi`

Selected Recent Conferences, Seminars, Colloquia

1. Invited Seminar Talk, University of Notre Dame, Notre Dame, IN, Oct 2018
2. Invited Participant, Kavli/AURA Salon Workshop, "Terabytes to Science", Chicago, IL, Jul 2018
3. Participant, Aspen Workshop, Dynamics of the Milky Way System in the Era of Gaia, Aspen, CO, Sep 2018
4. Organizer, KICP Workshop, Near-Field Cosmology with DES's DR1 and Beyond, Chicago, IL, Jun 2018
5. Invited Long-term Participant, KITP Workshop, The Small-Scale Structure of Cold(?) Dark Matter, Santa Babara, CA, May 2018
6. Invited Plenary Talk, SnowPAC, Big Questions, Big Surveys, Big Data: Astronomy & Cosmology in the 2020s, Snowbird, UT, May 2018
7. Invited Participant, PITT PACC Workshop, Probing the Nature of Dark Matter with LSST, University of Pittsburgh, Pittsburgh, PA, Mar 2018
8. Seminar Talk, Friday Scientific Lunch Talks (FLASH), NOAO, Tucson, AZ, Jan 2018
9. Colloquium, CSIRO Astronomy and Space Science, Sydney, Australia, Nov 2017
10. Colloquium, Australia Astronomical Observatory, Sydney, Australia, Nov 2017
11. Invited Seminar Talk, University of Pittsburgh, Pittsburgh, PA, Oct 2017
12. Invited Webinar Talk, LIneA, Brazil, Sep 2017
13. Invited Seminar Talk, Purple Mountain Observatory, Nanjing, China, Sep 2017
14. Contributed Talk, Shedding Light on the Dark Universe with Extremely Large Telescopes, Lanzhou, China, Aug 2017
15. Invited Seminar Talk, Texas A&M University, College Station, TX, May 2017

16. Contributed Talk, 4th Magellan Science Symposium, Washington D.C., Dec 2016
17. Invited Talk, Future Cosmic Surveys Workshop, Chicago, IL, Sep 2016
18. Invited Talk, Southern Spectroscopic Survey Meeting, Chicago, IL, Aug 2016
19. Invited Participant, Maximizing Science in the Era of LSST: A Community-based Study of Needed US OIR Capabilities, Tuscon, May 2016
20. Invited Seminar Talk, National Astronomical Observatory of China, Beijing, China, Mar 2016
21. Invited Seminar Talk, Shanghai Astronomical Observatory, Shanghai, China, Mar 2016
22. Invited Seminar Talk, Department of Astrophysics, University of Toronto, Toronto, Canada, Jan 2016
23. Invited Seminar Talk, Lawrence Berkeley National Laboratory, Dec 2015
24. Invited Seminar Talk, Department of Astronomy and Astrophysics, UC Santa Cruz, Dec 2015
25. Invited Seminar Talk, Department of Astronomy, Harvard University, Dec 2015
26. Invited Talk, 227th Meeting of the American Astronomical Society, Kissimmee, FL, Jan 2016
27. Invited Talk, 2015 Meeting of the APS Division of Particles and Fields (DPF 2015), Ann Arbor, MI, Aug 2015
28. Contributed Talk, GMT Community Science Meeting: reSovling Galaxies in the Era of Extremely Large Telescopes, Pacific Grove, CA, Oct 2015
29. Contributed Talk, Thirty Meter Telescope Science Forum, Washington D.C., May 2015
30. Contributed Talk, DECam Community Science Workshop, Tuscon, AZ, March 2015

References

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Selected Refereed Publications

Summary: 140+ total refereed publications, 32 with significant contribution, including 7 1st author, 6 2nd/3rd author.
For complete publication list, please refer to
`http://adsabs.harvard.edu/cgi-bin/nph-abs_connect?library&libname=TSL_paper`

1. Erkal, D., Belokurov, V., Laporte, C. F. P., Koposov, S. E., **Li, T. S.**, et al. "The total mass of the Large Magellanic Cloud from its perturbation on the Orphan stream", submitted to MNRAS, arXiv: 1812.08192
2. Koposov, S. E., Belokurov, V., **Li, T. S.**, et al. "Piercing the Milky Way: an all-sky view of the Orphan Stream", submitted to MNRAS, arXiv: 1812.08172
3. Torrealba, G., Belokurov, V., Koposov, S. E., **Li, T. S.**, et al. "The hidden giant: discovery of an enormous Galactic dwarf satellite in Gaia DR2", submitted to MNRAS, arXiv:1811.04082
4. Pace, A. B. & **Li, T. S.**, Proper motions of Milky Way Ultra-Faint satellites with *Gaia* DR2 $\times$ DES DR1, submitted to ApJ, arXiv:180602345.
5. Erkal, D., **Li, T. S.**, Koposov, S. E., Belokurov, V., et al., "Modelling the Tucana III stream - a close passage with the LMC", 2018, MNRAS, 481, 3148.
6. **Li, T. S.**, Simon, J. D., Kuehn, K., et al., "The First Tidally Disrupted Ultra-Faint Dwarf Galaxy? - Spectroscopic Analysis of the Tucana III Stream", 2018, ApJ, 866, 22.
7. Wang, Mei-Yu, de Boer, T., Pieres, A., **Li, T. S.**, et al., "The morphology and structure of stellar populations in the Fornax dwarf spheroidal galaxy from Dark Energy Survey Data", submitted, arXiv: 180907801.
8. **Li, T. S.**, Simon, J. D., Pace, A. B., et al. "Ships Passing in the Night: Spectroscopic Analysis of Two Ultra-faint Satellites in the Constellation Carina", 2018, ApJ, 857, 145.
9. Shipp, N., Drlica-Wagner, A., Balbinot, E., Ferguson, P., Erkal, D., **Li, T. S.**, et al., "Stellar Streams Discovered in the Dark Energy Survey", 2018, ApJ, 862, 114.
10. Bernstein, G. M., Abbott, T. M. C., Armstrong, R., Burke, D. L., Diehl, H. T., Gruendl, R. A., Johnson, M. D., **Li, T. S.**, et al., "Photometric Characterization of the Dark Energy Camera", 2018, PASP, 130, 4501.
11. Dey, Arjun et al. (including **Li, T. S.**), "Overview of the DESI Legacy Imaging Surveys", 2018, arXiv:180408657
12. Bergemann, M., Sesar, B., Cohen, J., Serenelli, A. M., Sheffield, A. A., **Li, T. S.** et al., "Witnessing Galactic eviction – disc stars at extreme locations around our Galaxy", 2018, Nature, 555, 334.
13. Nagasawa, D. Q., Marshall, J. L., **Li, T. S.** et al. "Chemical Abundance Analysis of Three α-Poor, Metal-Poor Stars in the Ultra-Faint Dwarf Galaxy Horologium I", 2018, ApJ, 852, 99.
14. Drlica-Wagner, A., et al. (including **Li, T. S.**), "Dark Energy Survey Year 1 Results: Photometric Data Set for Cosmology", 2018, ApJS, 235, 33.
15. Abbott, B. P., et al. (including **Li, T. S.**), "A gravitational-wave standard siren measurement of the Hubble constant", 2017, Nature, 551, 85.
16. Abbott, B. P., et al. (including **Li, T. S.**), "Multi-messenger Observations of a Binary Neutron Star Merger", 2017, ApJ, 848, L12.

17. Cowperthwaite, P. S., et al. (including **Li, T. S.**), "The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/Virgo GW170817. II. UV, Optical, and Near-infrared Light Curves and Comparison to Kilonova Models", 2017, ApJ, 848, L17.

18. Soares-Santos, M., et al. (including **Li, T. S.**), "The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/Virgo GW170817. I. Discovery of the Optical Counterpart Using the Dark Energy Camera", 2017, ApJ, 848, L16.

19. Johnston, K. V., Price-Whelan, A. M., Bergemann, M., Laporte, C., **Li, T. S.** et al., "Disk Heating, Galactoseismology, and the Formation of Stellar Halos", 2017, Galax, 5, 44.

20. **Li, T. S.**, Sheffield, A. A., Johnston, K. V., Marshall, J. L., Majewski, S. R. et al., "Exploring Halo Substructure with Giant Stars", 2017, ApJ, 844, 74.

21. Burke, D., Rykoff, E., et al. (including **Li, T. S.**), Forward Global Photometric Calibration of the Dark Energy Survey, 2018, AJ, 155, 41.

22. **Li, T. S.**, Simon, J. D., Drlica-Wagner, A., Bechtol, K., et al. "Farthest Neighbor: The Distant Milky Way Satellite Eridanus II", 2017, ApJ, 838, 8

23. Simon, J. D., **Li, T. S.**, Drlica-Wagner, A., Bechtol, K., et al. "Nearest Neighbor: The Low-mass Milky Way Satellite Tucana III", 2017, ApJ, 838, 44

24. Hansen, T. T., Simon, J. D., Marshall, J. L., **Li, T. S.**, et al. "An r-process Enhanced Star in the Dwarf Galaxy Tucana III", 2017, ApJ, 838, 11

25. **Li, T. S.**, DePoy, D. L., Marshall, J. L., Tucker, D. L., Bernstein, G. M., et al. "Assessment of Systematic Chromatic Errors that Impact Sub-1% Photometric Precision in Large-Area Sky Surveys", 2016, AJ, 151, 157

26. **Li, T. S.**, Balbinot, E., Mondrik, N., et al. "Discovery of a Stellar Overdensity in Eridanus-Phoenix in the Dark Energy Survey", 2016, ApJ, 817, 135

27. Balbinot, E., Yanny, B., **Li, T. S.**, et al. "The Phoenix stream: a cold stream in the Southern hemisphere", 2016, ApJ, 820, 58.

28. Melendez, J., Placco, V. M., Tucci-Maia, M., Ramirez, I., **Li, T. S.**, "2MASS J18082002-5104378: The Brightest (V=11.9) Ultra Metal-Poor Star", 2016, A&A, 585, 5

29. Simon, J. D., Drlica-Wagner, A., **Li, T. S.**, et al. "Stellar Kinematics and Metallicities in the Ultra-faint Dwarf Galaxy Reticulum II", 2015, ApJ, 808, 95

30. Drlica-Wagner, A., et al. (including **Li, T. S.**), "Eight Ultra-faint Galaxy Candidates Discovered in Year Two of the Dark Energy Survey", 2015, ApJ, 813, 109.

31. Drlica-Wagner, A., et al. (including **Li, T. S.**), "Search for Gamma-Ray Emission from DES Dwarf Spheroidal Galaxy Candidates with Fermi-LAT Data", 2015, ApJ, 809, L4

32. Bechtol, K., et al. (including **Li, T. S.**), "Eight New Milky Way Companions Discovered in First-year Dark Energy Survey Data", 2015, ApJ, 807, 50

33. Flaugher, B., et al. (including **Li, T. S.**), "The Dark Energy Camera", 2015, AJ, 150, 150

34. **Li, T. S.**, Marshall, J. L., Lépine, S., Williams, P., Chavez, J., "Optical BVRI Photometry of Common Proper Motion F/G/K+M Wide Separation Binaries", 2014, AJ, 148, 60

Conference Proceedings

1. **Li, T. S.**, DePoy, D. L., Marshall, J. L., Nagasawa, D. Q., Carona, D. W., Boada, S., "Monitoring the atmospheric throughput at Cerro Tololo Inter-American Observatory with aTmCam", 2014, Proc. of SPIE Vol. 9147, 91476Z, arXiv:14077047
2. DePoy, D. L., Allen, R., **Li, T. S.**, Marshall, J. L., Papovich, C., Prochaska, T., Shectman, S., "An update on the wide field, multi-object, moderate-resolution, spectrograph for the Giant Magellan Telescope", 2014, Proc. of SPIE Vol. 9147, 914720
3. Marshall, J. L., DePoy, D. L., Prochaska, T., Allen, R.D., Williams, P., Rheault, J.-P., **Li, T. S.**, and 22 colleagues, "VIRUS instrument collimator assembly", 2014, Proc. of SPIE Vol. 9147, 91473S
4. **Li, T. S.**, DePoy, D. L., Kessler, R., Burke, D. L., Marshall, J. L., Wise, J., Rheault, J.-P., Carona, D. W., Boada, S., Prochaska, T., Allen, R., "aTmcam: a simple atmospheric transmission monitoring camera for sub 1% photometric precision", 2012, Proc. of SPIE Vol. 8446, 84462L, arXiv:14077047

White Papers, Reports, Books

1. Chapter Author, Maximizing Science in the Era of LSST: A Community-Based Study of Needed US Capabilities, 2016, arXiv:161001661.
2. Chapter Author, GMT Science Book 2018: `https://www.gmto.org/gallery/gmt-resources/#GMT_Science_Book_2018`