Jiaxuan Li

Personal Information

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Research Interest

I am enthusiastic about almost all aspects of astrophysics and cosmology. Some of them are listed below.

- Low surface brightness astrophysics: galaxy outskirts, intra-cluster lights, ultra-diffuse galaxies.
- Galaxy evolution: quenching of galaxies, formation of massive galaxies, galaxy-halo connection.
- Cosmology: large-scale structure, weak lensing, cosmological simulations.
- Statistics and machine learning in astrophysics.

Education

Undergraduate Student, Department of Astronomy, Peking University, China — Sept 2016 - Now

- Major: Astrophysics.   GPA: 3.83/4.00 — | Detailed Transcript
- GRE General: verbal 153/170, quantitative 170/170, writing 3.5.
- GRE Physics: 990/990 (Percentile 94%)

Senior High School, Dingxi NO.1 Middle School, Dingxi, Gansu — Aug 2013 – June 2016

Research Positions

Summer Undergraduate Research Fellow, Yale University, U.S.	June 2019 – Sept 2019
Undergraduate Research Fellow, University of California, Santa Cruz, U.S.	Oct 2018 – Jan 2019
Undergraduate Research Assistant, Peking University, China	July 2017 – Now

Research Experience

Multi-resolution filtering: an empirical method for isolating faint, extended emission in Dragonfly data and other low resolution images

Advisor: Pieter van Dokkum — June 2019 – Sept 2019

We developed an empirical, self-contained method to isolate and study faint, large-scale emission in imaging data of low spatial resolution. Multi-resolution filtering (MRF) uses independent data of superior spatial resolution to create a model for all compact and high surface brightness objects in the field. The resulting image only contains emission fainter than a pre-defined surface brightness limit. The method is implemented in `mrf`, an open-source MIT licensed Python package

Reaching for the Edge: Probing the Outskirts of Massive Galaxies with HSC, DECaLS, SDSS and Dragonfly

Advisor: Alexie Leauthaud, Song Huang — Sept 2018 – Now

Probing the outskirts of massive galaxies can reveal the relation between galaxy itself and its dark matter halo. To push the detection limit of galaxy outskirt forward, we are using Hyper Suprime-Cam Subaru Strategic Survey (HSC-SSP) images and already get down to 29 mag/arcsec^2 and ~ 150 kpc. Furthermore, we compare HSC with Dark Energy Camera Legacy Survey (DECaLS) and Dragonfly Telephoto Array , try to find the difference between surveys as a correction. This work may help correct the previous galaxy mass measurements, and examine the existed relations on galaxy-halo connection.

SDSS IV MaNGA: Inside-out quenching galaxies with Hα ring-like structures

Advisor: Yingjie Peng   July 2017 – Now

We investigated galaxies with Hα emission ring-like structures in Mapping Nearby Galaxies at APO (MaNGA) survey, with stellar mass in the range $9.0 < \log(M/M_\odot) < 12.0$. These galaxies are almost located in the green valley on SFR-stellar mass plane. The radius of Hα rings are measured and good linear relations between bar length and Hα ring radius are found. We reveal that the appearance of Hα star-forming ring-like structure has a strong correlation with bar-induced activities. The majority of our Hα ring galaxy sample are galaxies which are classified as LINER with EW(Hα) < 3Å. Low luminosity AGN possibly plays a role in inside-out quenching accompanying with Hα ring-like structure.

HONORS AND AWARDS

Tang Li-Xin Scholarship (唐立新奖学金) (10,000 RMB per year)	May 2019
AEON Scholarship, Peking University (10,000 RMB)	Sept 2018
Leo KoGuan Scholarship (廖凯原奖学金), Peking University (10,000 RMB)	Oct 2017
Weiming Physics Oustanding Student (未名物理学子) (7,000 RMB per year)	2017, 2018, 2019
National Undergraduate Research & Training Program (10,000 RMB)	May 2019
Linbridge Prize for Excellent Undergraduate Astronomy Research (2,800 RMB)	Sept 2018
Merit Student, Peking University	2017, 2018
Excellent Member of Communist Youth League (优秀共青团员), Peking University	Mar 2018
Innovation Prize, Peking University	Oct 2017
First Prize, 8th China Undergraduate Physicists Tournament	Aug 2017
Meritorious Winner in Mathematical Contest In Modeling (MCM/ICM)	Apr 2018
8th Place in Beijing Division, AI Challenger: SEARCHING SUPERNOVAE IN SKY SURVEY	Apr 2019
Silver Medal, 9th International Olympiad on Astronomy and Astrophysics (IOAA)	Aug 2015
Gold Medal & Best Result, China National Astronomy Olympiad	2014, 2015
Gold Medal (3rd place), 1st Princeton University Physics Competition	Jan 2015

COMPUTER SKILLS

Skilled Languages:	Python, LaTeX, Mathematica, Shell/Bash, Git.
Experienced with:	• Significant experience with HSC, DECaLS, Dragonfly and SDSS-MaNGA data
	• Manipulating catalogs, analyzing dataset and visualization
	• Photometry of galaxies and low surface brightness features
Often-used Packages:	Astropy, IRAF, The tractor, GalSim, emcee, PyTorch.
Basic Knowledge:	SQL/ADQL, C/C++, Lightroom, Photoshop.
Software Contributions:	• mrf: Multi-Resolution Filtering: a method for isolating faint extended emission in Dragonfly data and other low resolution images
	• kungpao: Photometric analysis library for Hyper Suprime Camera images
	• unagi: Search and download data from Hyper Suprime Camera Subaru Strategic Survey (HSC-SSP)
	• Some of my works can be found on Github: @ASTROJACOBLI

OBSERVATIONAL EXPERIENCE

Peking University 40-cm Telescope (PKUFT)

Shane 3-m Telescope, UCO Lick Observatory: 2 nights observation of spectroscopy.   Jan 2019

Languages

English: Fluent.

TOEFL iBT: **109** (Jan 05, 2019).

Reading: 29, Listening: 28, Speaking: 24, Writing: 28.

Leadership Experience

President of Youth Astronomy Society (YAS), Peking University	May 2017 – May 2018
Monitor of Undergraduate Class 2016, Department of Astronomy	Sept 2016 – Now

Activities and Talks

Presentation in HSC galaxy group telecon	June 2019
Theoretical Problems Designer, 12th IOAA	Nov 2018
PKU Undergraduate Astronomy Symposium	Sept 2018
Mentor, Training for Chinese National Astronomy Olympiad Team	July 2018
PKU Representative, "Young Talent Plan" 10 Year Anniversary Symposium, USTC	July 2018
Asian Science Camp, Kampar, Malaysia	Aug 2017
Pacific Astronomy and Engineering Summit, Hawaii, U.S.	Aug 2014

References

Prof. Yingjie Peng   Kavli Institute on Astronomy and Astrophysics, Peking University

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Prof. Alexie Leauthaud   University of California, Santa Cruz

✉ alexie@ucsc.edu

Prof. Pieter van Dokkum   Yale University

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Dr. Song Huang   University of California, Santa Cruz

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