

Chihway Chang

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RESEARCH INTERESTS	Survey science: cosmology from galaxy surveys, CMB, and H _I intensity mapping Weak lensing: wide-field mass reconstruction, galaxy-galaxy lensing, systematic effects Galaxy-halo connection: small-scale physics and systematics, galaxy evolution Image simulation: forward modelling of wide-field imaging and spectroscopic data Instrumentation: CCD sensor characterization	
ACADEMIC APPOINTMENTS	The Kavli Institute for Cosmological Physics (KICP), University of Chicago KICP Fellow October 2016 – present Institute of Astronomy, ETH Zurich Postdoctoral Researcher September 2013 – September 2016 Advisor: Alexandre Refregier	
EDUCATION	Physics Department, Stanford University Ph.D., Department of Physics June 2013 <ul style="list-style-type: none">• Thesis Topic: <i>Systematic Effects in Weak Lensing Measurements for Future Optical Surveys</i>• Advisers: Prof. Steven M. Kahn & Prof. Rafe H. Schindler Physics Department, National Taiwan University B.S., Department of Physics June 2007	
AWARDS	Editor's choice in Physical Review Letters 2015 Our paper <i>Wide-Field Lensing Mass Maps from DES Science Verification Data</i> was selected and featured on the cover of PRL issue 115. The paper was also presented at the APS press release in April 2015 and covered in a number of scientific and public media. 62nd Meeting of Nobel Laureate , Lindau, Germany 2012 Nominated by the USA to attend.	
COLLABORATIONS	The South Pole Telescope (SPT) 2016 – present Member of the DES-SPT cross-correlation analysis group. The Dark Energy Survey (DES) 2013 – present Co-convener of the weak lensing mass mapping working group. Member of the science working groups: weak lensing, large-scale structure, simulation. The Large Synoptics Survey Telescope (LSST) 2010 – present Member of the LSST Dark Energy Science Collaboration (DESC). Coordinator of the DESC weak lensing pipeline project. Member of the LSST camera team.	
SELECTED TALKS	(* denotes invited talk) Astro/Cosmology Seminar* , CMU, PA, USA October 13, 2017 Astrophysics and Cosmology Seminar* , UIUC, IL, USA September 20, 2017 Cosmology Seminar* , BNL, NY, USA September 14, 2017	

	Instrumentation Seminar* , BNL, NY, USA	September 13, 2017
	The Nonlinear Universe , Smartno, Slovenia	July 20, 2017
	Fermilab 50th User Meeting* , Fermilab, IL, USA	June 8, 2017
	KICP Colloquium* , KICP, IL, USA	May 31, 2017
	Astronomy Chalk Talk* , U of Chicago, IL, USA	January 24, 2017
	Cosmology Seminar* , UCL, London, UK	December 21, 2016
	Astronomy Colloquium* , UIUC, IL, USA	November 1, 2016
	KICP Friday Seminar* , KICP, IL, USA	October 7, 2016
	Cosmology Seminar , KIPAC, CA, USA	May 16, 2016
	Kosmologietag Overview Talk* , Bielefeld University, Germany	April 29, 2016
	Astronophysics Colloquium , ASIAA, Taipei, Taiwan	March 28, 2016
	RAS Specialist Discussion Meeting* , London, UK	February 12, 2016
	Swiss Python Summit , Rapperswil, Switzerland	February 5, 2016
	Astrophysics Seminar , Rutgers University, NJ, USA	August 11, 2015
	Cosmology Lunch , Princeton University, NY, USA	August 10, 2015
	Fourteenth Marcel Grossmann Meeting (MG14) , Rome, Italy	July 17, 2015
	APS April meeting , Baltimore, MD, USA	April 14, 2015
	Weekly Colloquium , IEEC-CSIC, Barcelona, Spain	October 8, 2014
	Astrophysics Seminar , ASIAA, Taipei, Taiwan	September 19, 2014
	Research Seminar* Shanghai Jiao Tong University, Shanghai, China	September 9, 2014
	DES-LSST Joint Workshop , Fermilab, IL, USA	March 24, 2014
	Swiss Cosmology Day , ETH Zurich, Switzerland	February 6, 2014
	ETH Research Seminar , ETH Zurich, Zurich, Switzerland	September 19, 2013
	Astrophysics Seminar , JPL, CA, USA	September 2012
	Special Seminar , IPMU, Tokyo, Japan	August 2012
	SnowPAC , Snowbird, CO, USA	March 22, 2012
STUDENT MENTORING	Dimitrios Tanoglidis : PhD student at KICP, Summer 2017 – present	
	Rebecca Chen : undergraduate student at KICP, Winter 2016 – present	
	Gourav Khullar : PhD student at KICP, Winter 2016 – present	
	Giulia Chirivi : undergraduate student at ETH Zurich, Fall 2015	
	Fabienne Dahinden : undergraduate student at ETH Zurich, Spring 2015	
	Sebastian Gaebel : master student at ETH Zurich, Spring 2014	
TEACHING AND OUTREACH	KICP	
	Volunteer at the Adler Planetarium: <i>Astronomy Conversations</i>	2016 – present
	ETH Zurich	
	Astrophysics I: <i>Substitute Lecturer</i>	Fall 2015, Fall 2014
	Astrowoche: <i>Teaching Assistant</i>	Spring 2016, Spring 2015
	Cosmological Probes: <i>Teaching Assistant and Substitute Lecturer</i>	Spring 2014
	Stanford University / SLAC National Accelerator Laboratory	
	Physics 21, Mechanics and Heat: <i>Teaching Assistant</i>	Fall 2011
	Physics 23, Electricity and Optics: <i>Teaching Assistant</i>	Winter 2007
	Physics 41, Light and Heat: <i>Teaching Assistant</i>	Fall 2007
	SLAC tour guide	2010 – 2013

REFERENCES

Prof. Joshua A. Frieman (frieman@fnal.gov; +1-630-840-2226; +1-773-702-7971)

- Professor of Astronomy & Astrophysics and KICP, University of Chicago
- Senior staff member in the Theoretical Astrophysics group at Fermilab
- Director of the Dark Energy Survey (DES)

Prof. Steven M. Kahn (skahn@slac.stanford.edu; +1-650-926-4622)

- Professor of Physics Department, Stanford University
- Director of the Large Synoptic Survey Telescope (LSST)

Prof. Scott Dodelson (sdodelso@andrew.cmu.edu; +1-412-268-5432)

- Professor and Department Head of Physics, Carnegie Mellon University

Prof. Bhuvnesh Jain (bjain@physics.upenn.edu; +1-215-573-5330)

- Professor of Physics and Astronomy Department, University of Pennsylvania

Publication List

SUBMITTED JOURNAL PUBLICATIONS

36. M. Gatti, ...**C. Chang** et al., *Dark Energy Survey Year 1 Results: Cross-Correlation Redshifts - Methods and Systematics Characterization*. ArXiv e-prints (2017) [1709.00992](#).
35. **C. Chang**, A. Pujol, B. Mawdsley, D. Bacon, J. Elvin-Poole, et al., *Dark Energy Survey Year 1 Results: Curved-Sky Weak Lensing Mass Map*. ArXiv e-prints (2017) [1708.01535](#).
34. T. M. C. Abbott, ...**C. Chang** et al., *Dark Energy Survey Year 1 Results: Cosmological Constraints from Galaxy Clustering and Weak Lensing*. ArXiv e-prints (2017) [1708.01530](#).
33. B. Hoyle, ...**C. Chang** et al., *Dark Energy Survey Year 1 Results: Redshift Distributions of the Weak Lensing Source Galaxies*. ArXiv e-prints (2017) [1708.01532](#).
32. J. Prat, ...**C. Chang** et al., *Dark Energy Survey Year 1 Results: Galaxy-Galaxy Lensing*. ArXiv e-prints (2017) [1708.01537](#).
31. M. A. Troxel, ...**C. Chang** et al., *Dark Energy Survey Year 1 Results: Cosmological Constraints from Cosmic Shear*. ArXiv e-prints (2017) [1708.01538](#).
30. E. Krause, ...**C. Chang** et al., *Dark Energy Survey Year 1 Results: Multi-Probe Methodology and Simulated Likelihood Analyses*. ArXiv e-prints (2017) [1706.09359](#).

REFEREED JOURNAL PUBLICATIONS

29. E. Baxter, **C. Chang**, B. Jain, S. Adhikari, N. Dalal et al., *The Halo Boundary of Galaxy Clusters in the SDSS*. ApJ **841**, 18 (2017) [1702.01722](#).
28. J. Akeret, **C. Chang**, A. Lucchi, A. Refregier, *Radio Frequency Interference Mitigation using Deep Convolutional Neural Networks*. A&C **18**, 35–39 (2017) [1609.09077](#).
27. J. Akeret, S. Seehars, **C. Chang**, C. Monstein, A. Amara, A. Refregier, *HIDE & SEEK: End-to-End Packages to Simulate and Process Radio Survey Data*. A&C **18**, 8–17 (2017) [1607.07443](#).
26. **C. Chang**, C. Monstein, J. Akeret, S. Seehars, A. Refregier et al., *An Integrated System at the Bleien Observatory for Mapping the Galaxy*. MNRAS **464**, 1727–1737 (2017) [1607.07451](#).
25. N. MacCrann, ...**C. Chang** et al., *Inference from the Small Scales of Cosmic Shear with Current and Future Dark Energy Survey Data*. MNRAS **465**, 2567–2583 (2017). [1608.01838](#).
24. L. Clerkin, ...**C. Chang** et al., *Testing the Lognormality of the Galaxy and Weak Lensing Convergence Distributions from Dark Energy Survey Maps*. MNRAS **466**, 1444–1461 (2017). [1605.02036](#).
23. T. Kacprzak, ... **C. Chang**..., et al., *Cosmology Constraints from Shear Peak Statistics in Dark Energy Survey Science Verification Data*. MNRAS **463**, 3653–3673 (2016), [1603.05040](#).
22. B. Nord, ... **C. Chang**..., et al., *SPOKES: An End-to-End Simulation Facility for Spectroscopic Cosmological Surveys*. A&C **15**, 1–15 (2016), [1602.01480](#).
21. D. Kirk, Y. Omori, A. Benoit-Levy, R. Cawton, **C. Chang** et al., *Cross-correlation of Gravitational Lensing from DES Science Verification, SPT and Planck*. MNRAS **459**, 21 (2016), [1512.04535](#).
20. A. Pujol, **C. Chang**, E. Gazganaga, A. Amara, A. Refregier et al., *A New Method to Measure Galaxy Bias from the Density and Weak Lensing Fields*. MNRAS **462**, 35–47 (2016) [1601.00160](#).

19. **C. Chang**, A. Pujol, E. Gazganaga, A. Amara, A. Refregier et al., *Galaxy Bias from the DES Science Verification Data: Combining Galaxy Density Maps and Weak Lensing Maps*. MNRAS **459**, 3203 (2016), [1601.00405](#).
18. The Dark Energy Survey Collaboration .. **C. Chang**..., et al., *Cosmology from Cosmic Shear with DES Science Verification Data*. PRD **94**, 022001 (2016), [1507.05552](#).
17. M. Jarvis, ... **C. Chang**..., et al., *The DES Science Verification Weak Lensing Shear Catalogs*. MNRAS **460**, 2245 (2016), [1507.05603](#).
16. M.R. Becker, ... **C. Chang**..., et al., *Cosmic Shear Measurements with DES Science Verification Data*. PRD **94**, 022002 (2016), [1507.05598](#).
15. B. Leistedt, ... **C. Chang**..., et al., *Mapping and Simulating Systematics due to Spatially-Varying Observing Conditions in DES Science Verification Data*. ApJS **226**, 24 (2016), [1507.05647](#).
14. C. Bonnett, ... **C. Chang**..., et al., *Redshift Distributions of Galaxies in the DES Science Verification Shear Catalogue and Implications for Weak Lensing* PRD **94**, 042005 (2016), [1507.05909](#).
13. C. Bruderer, **C. Chang**, A. Refregier, A. Amara, J. Berge et al., *Calibrated Ultra Fast Image Simulations for the Dark Energy Survey*. ApJ **817**, 25 (2016), [1504.02778](#).
12. **C. Chang**, C. Monstein, A. Refregier, A. Amara, A. Glauser et al., *Beam Calibration of Radio Telescopes with Drones*. PASP **127**, 1131–1143, (2015), [1505.05885](#).
11. **C. Chang**, V. Vikram, B. Jain, D. Bacon, A. Amara et al., *Wide-Field Lensing Mass Maps from DES Science Verification Data*. PRL **115**, 051301 (2015), [1505.01871](#).
10. V. Vikram, **C. Chang**, B. Jain, D. Bacon, A. Amara et al., *Wide-Field Lensing Mass Maps from DES Science Verification Data: Methodology and Detailed Analysis*. PRD **92**, 022006 (2015), [1504.03002](#).
9. J.R. Peterson, ... **C. Chang**... et al., *Simulation of Astronomical Images from Optical Survey Telescopes using a Comprehensive Photon Monte Carlo Approach*. ApJS **218**, 14 (2015), [1504.06570](#).
8. **C. Chang**, M.T. Busha, R.H. Wechsler, A. Refregier, A. Amara et al., *Modelling the Transfer Function for the Dark Energy Survey*. ApJ **801**, 73 (2015), [1411.0032](#).
7. **C. Chang** and B. Jain, *Delensing Galaxy Surveys*. MNRAS **443**, 102 (2014), [1405.1432](#).
6. R. Mandelbaum, B. Rowe, J. Bosch, **C. Chang**, F. Courbin et al., *The Third Gravitational Lensing Accuracy Testing (GREAT3) Challenge Handbook*. ApJS **212**, 5 (2014), [1308.4982](#).
5. **C. Chang**, M. Jarvis, B. Jain, S.M. Kahn, D. Kirkby et al., *The Effective Number Density of Galaxies for Weak Lensing Measurements in the LSST Project*. MNRAS **434**, 2121 (2013), [1305.0793](#).
4. D. Bard, J.M. Kratochvil, **C. Chang**, M. May, S.M. Kahn et al., *Effect of Measurement Errors on Predicted Cosmological Constraints from Shear Peak Statistics with LSST*. ApJ **774**, 49 (2013), [1301.0830](#).
3. **C. Chang**, S.M. Kahn, J.G. Jernigan, J.R. Peterson, Y. AlSayyad et al., *Spurious Shear in Weak Lensing with LSST*. MNRAS **428**, 2695 (2013), [1206.1378](#).
2. **C. Chang**, P.J. Marshall, J.G. Jernigan, J.R. Peterson, S.M. Kahn et al., *Atmospheric PSF Interpolation for Weak Lensing in Short Exposure Imaging Data*. MNRAS **427**, 2572 (2012), [1206.1383](#).
1. J. Singal, R. Schindler, **C. Chang**, P. Czodrowski, and P. Kim, *A Multi-Chamber System for Analyzing the Outgassing, Deposition, and Associated Optical Degradation Properties of Materials in a Vacuum*. Review of Scientific Instruments **81**, 025101 (2010), [0910.4198](#).

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POSTERS

9. The LSST Dark Energy Science Collaboration, *LSST Dark Energy Science Collaboration*. ArXiv e-prints (2012) [1211.0310](#).
8. J.R. Peterson, ... **C. Chang**..., et al., *LSST Image Simulations*. American Astronomical Society Meeting Abstracts, **219**, (2012).
7. A. Bradshaw, ... **C. Chang**..., et al., *LSST Probes of Dark Energy: New Energy vs New Gravity*. American Astronomical Society Meeting Abstracts, **219**, (2012).
6. R.R. Gibson, ... **C. Chang**..., et al., *A Framework for End to End Simulations of the Large Synoptic Survey Telescope*. Astronomical Data Analysis Software and Systems XX, **442**, p.329, (2011).
5. J. Pizagno, ... **C. Chang**..., et al., *Strong Lenses with LSST: Simulated 10-year Movies of Multiply-Imaged Quasars*. American Astronomical Society Meeting Abstracts, **217**, (2011).
4. **C. Chang**, S.M Kahn, G. Jernigan, J.R. Peterson, A. Rasmussen et al., *Shear Systematics in LSST Simulated Images*. American Astronomical Society Meeting Abstracts, **217**, (2011).
3. G. Jernigan, ... **C. Chang**..., et al., *Strong Lenses with LSST: Simulated 10-year Movies of Multiply-Imaged Quasars*. American Astronomical Society Meeting Abstracts, **217**, (2011).
2. K.S. Krughoff, ... **C. Chang**..., et al., *Strong Lenses with LSST: Simulated 10-year Movies of Multiply-Imaged Quasars*. American Astronomical Society Meeting Abstracts, **217**, (2011).
1. A. Connolly, ... **C. Chang**..., et al., *Simulating the LSST system*. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series **7738**, p.1, (2010). [SPIE](#).

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PREPARATION

3. **C. Chang**, E. Baxter, B. Jain, C. Sanchez et al., *The Splashback Feature around DES Galaxy Clusters: Galaxy Density and Weak Lensing Profiles*.
2. W. Hartley, **C. Chang** et al., *Spectroscopic Incompleteness in Dark Energy Experiments*.
1. N. Jeffrey,... **C. Chang**..., et al., *Comparison of Convergence Reconstruction Methods with DES SV*.