

## Chihway Chang

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CONTACT INFORMATION	<p>The University of Chicago The Kavli Institute for Cosmological Physics William Eckhardt Research Center 427 5640 South Ellis Avenue Chicago, IL 60637, USA</p>	<p>Work: +1-773-702-4314 E-mail: <a href="mailto:chihway@kicp.uchicago.edu">chihway@kicp.uchicago.edu</a> WWW: <a href="https://chihway.github.io">https://chihway.github.io</a></p>
RESEARCH INTERESTS	<p><b>Weak gravitational lensing:</b> wide-field mass reconstruction, cosmic shear, combining weak lensing surveys with LSS and CMB to constrain cosmology, systematic effects</p> <p><b>Galaxy-halo connection:</b> small-scale physics and systematics, galaxy evolution</p> <p><b>Image simulation:</b> forward modelling of wide-field imaging and spectroscopic data</p> <p><b>Instrumentation:</b> CCD sensor characterization and metrology</p> <p><b>H<sub>I</sub> intensity mapping:</b> simulation and data processing, calibration, cosmology</p>	
ACADEMIC APPOINTMENTS	<p><b>The Kavli Institute for Cosmological Physics (KICP), University of Chicago</b></p> <p>KICP Fellow <span style="float: right;">October 2016 – present</span></p> <p><b>Institute of Astronomy, ETH Zurich</b></p> <p>Postdoctoral Researcher <span style="float: right;">September 2013 – September 2016</span> Advisor: Alexandre Refregier</p>	
EDUCATION	<p><b>Physics Department, Stanford University</b></p> <p>Ph.D., Department of Physics <span style="float: right;">June 2013</span></p> <ul style="list-style-type: none"><li>• Thesis Topic: <i>Systematic Effects in Weak Lensing Measurements for Future Optical Surveys</i></li><li>• Advisers: Prof. Steven M. Kahn &amp; Prof. Rafe H. Schindler</li></ul> <p><b>Physics Department, National Taiwan University</b></p> <p>B.S., Department of Physics <span style="float: right;">June 2007</span></p>	
AWARDS	<p><b>Editor's choice in Physical Review Letters</b> <span style="float: right;">2015</span> 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.</p> <p><b>62nd Meeting of Nobel Laureate</b>, Lindau, Germany <span style="float: right;">2012</span> Nominated by the USA to attend.</p>	
COLLABORATIONS	<p><b>The Dark Energy Survey (DES)</b> <span style="float: right;">2013 – present</span> Co-convener of the weak lensing mass mapping working group. Member of the science working groups: weak lensing, large-scale structure, simulation.</p> <p><b>The 3rd GRavitational lEnsing Accuracy Testing challenge</b> <span style="float: right;">2012 – 2013</span> Organization team.</p> <p><b>The Large Synoptics Survey Telescope (LSST)</b> <span style="float: right;">2010 – 2013</span> Member of the science working groups: weak lensing, simulation. Member of the LSST Dark Energy Science Collaboration. Member of the LSST camera team.</p>	

SELECTED TALKS	<b>The Nonlinear Universe</b> , Smartno, Slovenia	July 20, 2017
	<b>Invited Talk at Fermilab 50th User Meeting</b> , IL, USA	June 8, 2017
	<b>KICP Colloquium</b> , IL, USA	May 31, 2017
	<b>University of Chicago Astronomy Chalk Talk</b> , IL, USA	January 24, 2017
	<b>UCL Cosmology Seminar</b> , London, UK	December 21, 2016
	<b>UIUC Astronomy Colloquium</b> , IL, USA	November 1, 2016
	<b>KICP Friday Seminar</b> , IL, USA	October 7, 2016
	<b>KIPAC Cosmology Seminar</b> , CA, USA	May 16, 2016
	<b>Kosmologietag Invited Speaker</b> , Bielefeld University, Germany	April 29, 2016
	<b>ASIAA Colloquium</b> , Taipei, Taiwan	March 28, 2016
	<b>RAS Specialist Discussion Meeting</b> , London, UK	February 12, 2016
	<b>Swiss Python Summit</b> , Rapperswil, Switzerland	February 5, 2016
	<b>Astrophysics Seminar</b> , Rutgers University, NJ, USA	August 11, 2015
	<b>Cosmology Lunch</b> , Princeton University, NY, USA	August 10, 2015
	<b>Open Group Seminar</b> , KICP, Chicago, IL, USA	August 6, 2015
	<b>Fourteenth Marcel Grossmann Meeting (MG14)</b> , Rome, Italy	July 17, 2015
	<b>APS April meeting</b> , Baltimore, MD, USA	April 14, 2015
	<b>Weekly Colloquium</b> , IEEC-CSIC, Barcelona, Spain	October 8, 2014
	<b>Astrophysics Seminar</b> , ASIAA, Taipei, Taiwan	September 19, 2014
	<b>Research Seminar</b> Shanghai Jiao Tong University, Shanghai, China	September 9, 2014
	<b>DES-LSST Joint Workshop</b> , Fermilab, IL, USA	March 24, 2014
	<b>Swiss Cosmology Day</b> , ETH Zurich, Switzerland	February 6, 2014
	<b>ETH Research Seminar</b> , ETH Zurich, Zurich, Switzerland	September 19, 2013
	<b>Astrophysics Seminar</b> , JPL, CA, USA	September 2012
	<b>Special Seminar</b> , IPMU, Tokyo, Japan	August 2012
	<b>SnowPAC</b> , Snowbird, CO, USA	March 22, 2012
STUDENT MENTORING	<b>Dimitrios Tanoglidis</b> : PhD student at KICP, Summer 2017 – present	
	<b>Rebecca Chen</b> : undergraduate student at KICP, Winter 2016 – present	
	<b>Gourav Khullar</b> : PhD student at KICP, Winter 2016 – present	
	<b>Giulia Chirivi</b> : undergraduate student at ETH Zurich, Fall 2015	
	<b>Fabienne Dahinden</b> : undergraduate student at ETH Zurich, Spring 2015	
	<b>Sebastian Gaebel</b> : master student at ETH Zurich, Spring 2014	
TEACHING AND OUTREACH	<b>KICP</b>	
	<b>Volunteer at the Adler Planetarium: Astronomy Conversations</b>	2016 – present
	<b>ETH Zurich</b>	
	<b>Astrophysics I: Substitute Lecturer</b>	Fall 2015, Fall 2014
	<b>Astrowoche: Teaching Assistant</b>	Spring 2016, Spring 2015
	<b>Cosmological Probes: Teaching Assistant and Substitute Lecturer</b>	Spring 2014
	<b>Stanford University / SLAC National Accelerator Laboratory</b>	
	<b>Physics 21, Mechanics and Heat: Teaching Assistant</b>	Fall 2011
	<b>Physics 23, Electricity and Optics: Teaching Assistant</b>	Winter 2007
	<b>Physics 41, Light and Heat: Teaching Assistant</b>	Fall 2007
	<b>SLAC tour guide</b>	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. Scott Dodelson** (scott.dodelson@gmail.com; +1-630-840-2426)

- Professor of Astronomy & Astrophysics and KICP, University of Chicago
- Senior staff member in the Theoretical Astrophysics group at Fermilab

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

- Professor of Physics and Astronomy Department, University of Pennsylvania

**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. Alexandre Refregier** (alexandre.refregier@phys.ethz.ch; +41-44-632-3632)

- Professor of Physics Department, ETH Zurich

**Dr. David Bacon** (david.bacon@port.ac.uk; +44-2392-845831)

- Reader in cosmology, University of Portsmouth

## Publication List

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### SUBMITTED JOURNAL PUBLICATIONS

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](#).

JOURNAL  
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PREPARATION

2. *The Splashback Feature around DES Galaxy Clusters: Galaxy Density and Weak Lensing Profiles*.
1. W. Hartley, **C. Chang** et al., *Spectroscopic incompleteness in Dark Energy Experiments*.