

Curriculum Vitae: Yan-Chuan Cai (March 2015)

Personal Details

Name: Yan-Chuan Cai

Address:

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Education

- 2006–2009 PhD in Physics, Durham University, Durham, UK,
‘Constraining dark energy using real and mock galaxy surveys’
Thesis advisors: Prof. S.M. Cole, Prof. C.S. Frenk & Dr. A. Jenkins
Examiners: Prof. Andrew Liddle & Prof. Tom Shanks
- 2004–2006 M. S. in Astrophysics, Chinese Academy of Sciences, Beijing, China
- 2000–2004 B. S. in Applied Physics, Shanghai Jiao Tong University, Shanghai, China

Research Experiences

- 2014–present, Postdoctoral research fellow, IfA, University of Edinburgh
- 2012–2014, Durham Junior Fellow, ICC, Physics Dept. Durham University,
worked on test of gravity, cosmic voids, gravitational redshift, ISW etc., in collaboration with Joseph Clampitt, Shaun Cole, Carlos Frenk, Nick Kaiser, Baojiu Li, Mark Neyrinck, Nelson Pedilla & Istvan Szapudi
- 2009–2012, Postdoctoral Fellow, Physics & Astronomy, University of Pennsylvania,
worked on large-scale structure & weak lensing, in collaboration with Gary Bernstein and Ravi Sheth
- 2006–2009, ICC, Physics Dept. Durham University,
Marie Curie Research Fellow, worked in the probe of dark energy using real and mock galaxy surveys with Carlton Baugh, Shaun Cole, Carlos Frenk & Adrian Jenkins
- 2005–2006, Purple Mountain Observatory, Nanjing, China
worked with Jun Pan, Long-Long Feng & Li-Zhi Fang on large-scale structure, using N-body simulation, 2dF & SDSS data
- 2004–2005, National Astronomical Observatories, Beijing, China
worked with Xiang-Ping Wu on the epoch of dark age and reionisation

Research Interests

I am interested in theoretical cosmology, including large-scale structure, secondary effects of the cosmic microwave background, cosmic voids and superclusters, redshift space distortions, gravitational lensing, gravitational redshift and cluster dynamics.

Awards and Distinctions

- 2012-2014, Durham Junior Fellowship
- 2006-2009, Marie Curie Research Fellowship
- 2005, Chinese Academy of Sciences Triple A Student
- 2002, Shanghai Jiao Tong University Triple A Student
- 2001 & 2003, Shanghai Jiao Tong University Excellent Student Scholarship

Teaching & Services:

- I was teaching level-2 Classical Mechanics and Quantum Theory as a workshop tutor and example class tutor for the Physics Department in Durham University for the academic year of 2012-2013 and 2013-2014.
- Current PhD student: Alexandra Amon (co-supervising)
- Referee for ‘**Nature**’, ‘**Monthly Notices of the Royal Astronomical Society**’ and the ‘**Astro-physical Journal**’
- I helped to organize the conference ‘Ripples in the Cosmos’ held in Durham (July 22-26) as a member of the Local Organizing Committee.
- I contributed to the Royal Society’s Summer Science Exhibition as one of exhibitor of the Durham team selected to exhibit Cosmology in Crisis: What is the Matter? 1st-7th July 2013 and in Newcastle at the British Science Festival, 7th-12th September 2013.

Skills

- C, FORTRAN, IDL & Python program, HEALpix
- English, Teochew, Cantonese and Mandarin

References

Prof. John Peacock
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Royal Observatory
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Email: jap@roe.ac.uk
Tel: 0044-131-668-8390

Prof. Gary Bernstein
Reese W. Flower Professor
4N1 David Rittenhouse Lab, 209 S 33rd St
University of Pennsylvania
Philadelphia, PA 19104, USA
Email: garyb@physics.upenn.edu
Tel: 001-215-573-6252

Prof. Carlos Frenk
Institute for Computational Cosmology
Ogden Centre, Physics Department
Durham University,
Durham DH1 3LE, UK
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Prof. Shaun Cole
Institute for Computational Cosmology
Ogden Centre, Physics Department
Durham University,
Durham DH1 3LE, UK
Email: Shaun.Cole@durham.ac.uk
Tel: 0044-191-334-3593

Published Papers

13. **Yan-Chuan Cai**, Nelson Padilla & Baojiu Li
'Testing Gravity using Cosmic Voids'
arXiv:1410.1510, submitted to MNRAS

12. Tsz-Yan Lam, Joseph Clampitt, **Yan-Chuan Cai** & Baojiu Li
'Voids in Modified Gravity Reloaded: Eulerian Void Assignment'
arXiv:1408.5338, submitted to MNRAS

11. **Yan-Chuan Cai**, Baojiu Li, Shaun Cole, Carlos Frenk & Mark Neyrinck
'The Integrated Schas-Wolfe effect in $f(R)$ gravity',
MNRAS, 2014, 439, 2978C

10. **Yan-Chuan Cai**, Mark Neyrinck, Istvan Szapudi, Shaun Cole & Carlos Frenk
'A Possible Detection of the Cold Imprint of Voids on the Microwave Background Radiation',
ApJ, 2014, 786, 110C

9. Joseph Clampitt, **Yan-Chuan Cai** & Baojiu Li
'Voids in modified gravity: excursion set predictions',
MNRAS, 2013, 431, 749C

8. **Yan-Chuan Cai** & Gary Bernstein
'Combining weak lensing tomography and spectroscopic redshift surveys',
MNRAS, 2012, 422, 1045C

7. Gary Bernstein & **Yan-Chuan Cai**
'Cosmology without cosmic variance',
MNRAS, 2011, 416, 3009B

6. **Yan-Chuan Cai**, Gary Bernstein & Ravi K. Sheth
'Optimal linear reconstruction of dark matter from halo catalog',
MNRAS, 2011, 412, 995

5. **Yan-Chuan Cai**, Shaun Cole, Carlos Frenk & Adrian Jenkins
'Full-sky map of the ISW and Rees-Sciama effect from Gpc simulations',
2010, MNRAS, 407, 201C

4. **Yan-Chuan Cai**, Shaun Cole, Carlos Frenk & Adrian Jenkins
'Towards accurate modelling of the ISW effect, the non-linear contribution',
2009, MNRAS, 396, 772C

3. **Yan-Chuan Cai**, Raul Angulo, Carlton Baugh, Shaun Cole, Carlos Frenk & Adrian Jenkins
'Mock galaxy catalogues and their application to Pan-STARRS',
2009, MNRAS, 395, 1185C

2. **Yan-Chuan Cai**, Jun Pan, Yong-Heng Zhao, Long-Long Feng & Li-Zhi Fang
'The DWT Power Spectrum of the two-degree Field Galaxy Redshift Survey'
2008, ChJAA, 8, 159C

1. **Yan-Chuan Cai** & Jun Pan
 ‘Note on Redshift Distortion in Fourier Space’
 2007, ChJAA, 7, 51C

Other Papers

6. **Yan-Chuan Cai**, Nick Kaiser, Shaun Cole & Carlos Frenk
 ‘More about Gravitational Redshift’
 in preparation
5. **Yan-Chuan Cai**, Nick Kaiser, Shaun Cole & Carlos Frenk
 ‘Dynamical Analysis of Ensembles of Galaxy Clusters II’
 in preparation
4. **Yan-Chuan Cai**, Nelson Padilla & Baojiu Li
 ‘Testing Gravity using Void Profiles’
 Proceedings of IAU 308 Symposium ”The Zeldovich Universe”
3. Nelson Padilla, Dante Paz, Marcelo Lares, Laura Ceccarelli, Diego Garcia Lambas, **Yan-Chuan Cai**, Baojiu Li
 ‘Void Dynamics’ Proceedings of IAU 308 Symposium ”The Zeldovich Universe”
2. J.-P. Kneib, F. Abdalla, J. Annis, E. Aubourg, D. Bacon, S. Bailey, G. Bernstein, A. Bolton, N. Brandt, J. Brownstein, **Yan-Chuan Cai**, F. Castander, & other 54 authors
 ‘e-BOSS (extended BOSS) The novel Sloan legacy cosmological survey’
http://lamwww.oamp.fr/cosmowiki/Project_eBoss
1. **Yan-Chuan Cai**, Jun Pan, Yong-Heng Zhao, Long-Long Feng & Li-Zhi Fang
 ‘The DWT Power Spectrum of the two-degree Field Galaxy Redshift Survey’,
 2008, AIPC, 966, 87C (Conference proceeding)

Presentations and invited talks

- 2015, ‘More about Gravitational Redshift’, Stobie talk, IfA, Edinburgh
- 2015, ‘Testing Gravity using Cosmic Voids’, DEX XI Workshop, Big Surveys + Big Simulations = Big Science, Edinburgh
- 2014, ‘Testing Gravity using Cosmic Voids’, EUCLID UK Meeting, London
- 2014, ‘Redshift Space Distortion in Voids’, Darklight Workshop, Sesto, Italy (**Invited**)
- 2014, ‘Cosmic Voids as Probes for Cosmology’, IAU308 symposium, The Zeldovich Universe: Genesis and Growth of the Cosmic Web, Tallinn (**Invited**)
- 2014, ‘Multiple probes of gravity from large-scale structure’, Seminar, University of Helsinki, Helsinki, Finland (**Invited**)
- 2014, ‘Cosmic Voids as Probes for Cosmology’, From Dark Matter to Galaxies, Xi’an, China.
- 2014, ‘Multiple probes of gravity from large-scale structure’, Seminar, Institute of Theoretical Astrophysics, Oslo, Norway (**Invited**)
- 2014, ‘Cosmic Voids as Probes for Cosmology’, Tracing the Cosmic web, Leiden, Netherlands
- 2014, ‘Multiple probes of gravity from large-scale structure’, Seminar, Physics and Astronomy, University of Sussex, England (**Invited**)

- 2013, ‘Combined probes of gravity using galaxy surveys’, Cross-Correlating Cosmic Fields conference, Shanghai, China
- 2013, ‘Redshift Space Distortion & Lensing Combined’, MS-DESI Collaboration Meeting, Berkeley, USA (remote talk, **Invited**)
- 2013, ‘Imprints of super-structures on the CMB’, Ripples in the Cosmos, Durham, UK
- 2013, ‘Test of gravity using voids’, Theoretical challenges in Large Scale Structure, Ascona, Switzerland
- 2013, ‘Combined probes of gravity using galaxy surveys’, Seminar, CEFCA, Teruel, Spain (**Invited**)
- 2013, ‘Combined probes of gravity using galaxy surveys’, Seminar, University of Valencia, Spain
- 2012, ‘Towards understanding the stacked ISW signal’, Workshop on Large Scale Structure, Trieste, Italy
- 2012, ‘Strengthening RSD constraint on linear growth: combining photo- z and spec- z surveys’, Perturbative approaches to redshift space distortions, Zurich, Switzerland
- 2012, ‘Combining photo- z and spec- z surveys: Constraint on linear growth’, The Dark Energy Spectrometer workshop, Chicago, USA (**Invited**)
- 2011, ‘Combining photo- z and spec- z surveys: Cosmology from lensing and RSD’, Dark Energy Survey Collaboration Meeting, Philadelphia, USA
- 2011, ‘Combining photo- z and spec- z surveys: Cosmology from lensing and RSD’, seminar, Durham University, Durham, UK
- 2011, ‘Combining tomographies of weak lensing and galaxy redshift survey’, seminar, University of Edinburgh, Edinburgh, UK
- 2011, ‘Percent-level constraint of gravity from large-scale structure’, seminar, University of St-Andrews, St-Andrews, UK
- 2011, ‘Cosmology without cosmic variance’, Seminar, Purple Mountain Observatory, Nanjing, China
- 2011, ‘Percent level constraint on the the growth of structure’, Seminar, Shanghai Observatory, Shanghai, China
- 2011, ‘Cosmology without cosmic variance’, Friday talk, UPenn, Philadelphia, USA
- 2011, ‘Optimal mass reconstruction from dark matter halos’, The 9th Sino-German Workshop on Galaxy Formation and Cosmology, Hangzhou, China
- 2010, ‘Reconstructing dark matter from halos’, ICC Friday talk, Durham University, UK
- 2010, ‘Optimal linear reconstruction of dark matter from halo catalogs’, Seminar, University of St’Andrews, UK
- 2010, ‘Reconstructing dark matter from halos’, Dark Energy Survey Collaboration Meeting, Fermilab, Chicago, USA
- 2010, ‘Minimizing bias stochasticity’, 10th Great Lakes Cosmology Workshop, Chicago, USA
- 2010, ‘The non-linear ISW effect’, UPenn Friday talk, Philadelphia, USA
- 2009, ‘The non-linear Integrated Sachs-Wolf effect’, Virgo meeting, Durham, UK
- 2009, ‘Pilot research of Pan-STARRS1 large-scale structure’, UCL seminar, London, UK
- 2009, ‘Constraining dark energy using Pan-STARRS1 large-scale structure’, UPenn Friday talk, Philadelphia, USA
- 2008, ‘Second order contribution to the ISW effect’ (poster), Dark Energy Conference, Munich, Germany

- 2008, ‘Mock galaxy catalogues and their application to Pan-STARRS’ (poster), SDSS International Symposium, Chicago
- 2008, ‘ISW cross-correlation & dark energy’, 5th Italian-Sino Workshop, Taipei-Hualian, Taiwan
- 2008, ‘Pan-STARRS Mock Galaxy Catalogue #1’, Pan-STARRS1 Science Consortium Meeting, Heidelberg, Germany
- 2007, ‘Constructing Pan-STARRS Mock Galaxy Catalogues’, Durham, UK
- 2007, ‘Exploiting the Forthcoming Pan-STARRS Dataset’, 4th Italian-Sino Workshop, Italy
- 2006, ‘DWT Power Spectrum of 2dF and SDSS Galaxies’, 7th Sino-German Workshop on ‘Galaxies, Super Massive Black Holes and the Cosmic Web’, SHAO, Shanghai
- 2006, ‘DWT Power Spectrum of 2dF Galaxies and σ_8 ’, 3rd Italian-Sino Workshop, Pescara, Italy
- 2005, ‘On the Epoch of Reionisation—the 21cm Foreground’, Purple Mountain Observatory, Nanjing