

Wen Zhao

Korea Astronomy and Space Science Institute
Daejeon 305-348, Republic of Korea
Email: Wen.Zhao.2007@gmail.com

Person Statement

An energetic young scientist seeks a postdoctoral position in Cosmology.

Main research interests: Cosmic Microwave Background Radiation, Dark Energy, Gravitational Waves, Physics in the Early Universe.

Research Work Experiences

2007-2010 Lecturer
Department of Physics, Zhejiang University of Technology, P. R. China

2007-2010 Postdoctoral Research Fellow
School of Physics and Astronomy, Cardiff University, United Kingdom.
Supervisor: Prof. Leonid P. Grishchuk

Aug. 2010 Research Visitor
Discovery Center, Niels Bohr Institute, Copenhagen University, Denmark
Supervisor: Prof. Pavel Naselsky

2010-2011 Research Fellow
Astrophysics Group, Korea Astronomy and Space Science Institute, Korea.
Supervisor: Prof. Hyerim Noh

2011-2014 Postdoctoral Research Fellow
Discovery Center, Niels Bohr Institute, Copenhagen University, Denmark.
Supervisor: Prof. Pavel Naselsky

Education

2002-2006 Doctor of Philosophy
Center for Astrophysics, University of Science and Technology of China, P.R.China
Subject: Cosmology and General Relativity
Supervisor: Prof. Yang Zhang

1998-2002 Bachelor of Science

Center for Astrophysics, University of Science and Technology of China, P.R.China

Subject: Astronomy and Cosmology

Supervisor: Prof. Yang Zhang

Computer Skills

Good working knowledge in **Fortran, C, Matlab, Mathematica**. Experience working with **Healpix** Package, **CAMB** package, and running **MCMC chains**.

Relevant Skills and Experiences

- ◆ **Organizational duties:** Organizer of weekly Cosmology Seminar in University of Science and Technology of China (2004-2005).
- ◆ **Refereeing:** Referee for peer-review journals: European Physical Journal C, The Open Astronomy Journal, General Relativity and Gravitation
- ◆ **Language:** English and Chinese (Mandarin).

Teaching Experiences

- 2007:** Lab Demonstrator in first year physics lab at Zhejiang University of Technology.
- 2006:** Tutorial in "Thermodynamics and Statistical Physics" at University of Science and Technology of China.
- 2005:** Lab Demonstrator in second year physics lab at University of Science and Technology of China.
- 2005:** Tutorial in "General Physics" at University of Science and Technology of China.
- 2003:** Tutorial in "General Physics" at University of Science and Technology of China.

Awards and Honors

- 2010** Awarded the **Chinese National Science Funds granted No. 11075141**.
Grant title: Theoretical studies on the dynamical black hole and the observational test of the very early Universe
- 2009** **University teaching excellence prize for young scientists**. Awarded by Ministry of Education, Zhejiang Province.
- 2009** **PhD thesis was ranked as outstanding** by the Ministry of Education, Anhui Province.
- 2007** Awarded the **Chinese National Science Funds granted No. 10703005 (Primary recipient)**.
Grant title: Studies on dark energy, and its influence on gravitational waves and cosmic microwave background radiation.
- 2007** Awarded the **Chinese National Science Funds granted No. 10775119**.
Grant title: Research on black holes in dark energy dominated Universe and the related topics.

- 2005** Recipient of **Graduate Student Research Funding** from University of Science and Technology of China.
- 2002** **BSc thesis was ranked as outstanding** by the Ministry of Education, University of Science and Technology of China.

Conference and Seminars (recent)

- 2010** Talk entitled "Cosmic Microwave Background Polarization & Determination of Dark Energy by the Einstein Telescope" presented at the Cosmology Seminar, Center for Astrophysics, University of Science and Technology of China (Hefei).
- 2010** Talk entitled "Cosmic Microwave Background Polarization and Detection of Primordial Gravitational Waves" presented at 2010 Winter Symposium of the early Universe and dark energy, Institute of Theoretical Physics (Beijing)
- 2010** Attended "4th KIAS workshop on Cosmology and Structure Formation", Korea Institute for Advanced Study (Seoul)
- 2010** Talk entitled "Detecting relic gravitational waves in the CMB: from WMAP to CMBPol" presented at 2010 international workshop on gravitational waves detection with atom interferometry, Zhejiang University (Hangzhou)
- 2010** Attended UniverseNet Cosmology Workshop "Confronting theory with observations", The Niels Bohr International Academy (Copenhagen)
- 2010** Talk entitled "Effective Quantum Yang-Mills Condensate Dark Energy Models" presented at the Cosmology Seminar, Imperial College London (London).
- 2009** Talk entitled "The Cosmic Microwave Background Radiation as a Random Tensor Field on a sphere: Current Results and Future Plans for Detecting Relic Gravitational Waves" presented at the Annual WIMCS Meeting (Swansea).
- 2009** Co-Talk entitled "Stable indications of relic gravitational waves in Wilkinson Microwave Anisotropy Probe data and forecasts for Planck mission" presented at the Primordial Gravitational Waves Workshop (Cambridge).
- 2009** Talk entitled "Detecting Relic Gravitational Waves in the Cosmic Microwave Background Radiation" presented at the Relativity Seminar, Astronomy Unit, Queen Mary (London).
- 2009** Talk entitled "Detecting Relic Gravitational Waves in the CMB: Optimal parameters and their constraints" presented at Brit-Grav 9 conference (Cardiff).
- 2009** Talk entitled "Primordial Gravitational Waves and the Physics in the early Universe" presented

at the Cosmology Seminar, Center for Astrophysics, University of Science and Technology of China (Hefei).

- 2008** Talk entitled “Relic gravitational waves and their detection” presented at Gravitation and General Relativity Workshop in Beijing Normal University (Beijing).
- 2007** Talk entitled “The CMB TE Cross Correlation and Relic Gravitational Waves” presented at WIMCS meeting, Swansea University (Swansea)

Referees

Prof. Leonid P. Grishchuk, postdoctoral supervisor.

Address: School of Physics and Astronomy, Cardiff University, Queen’s Building, The Parade, Cardiff, CF24 3AA, Wales, United Kingdom.

Telephone: +44 (0) 2920 874665

Email: Leonid.Grishchuk@astro.cf.ac.uk

Prof. Yang Zhang, PhD supervisor.

Address: Center for Astrophysics, University of Science and Technology of Chinese, 96 Jinzhai Road, Hefei, 230026, P. R. China.

Telephone: +86 (0) 551 3606843

Email: yzh@ustc.edu.cn

List of Publications

Refereed Journals

- [1] **W.Zhao**, C.Van Den Broeck, D.Baskaran and T.G.F.Li, *Determination of dark energy by the Einstein Telescope: Comparing with CMB, BAO and SNIa observations*, Phys. Rev. D83 (2011) 023005 [arXiv:1009.0206]
- [2] **W.Zhao** and L.P.Grishchuk, *Relic gravitational waves: Latest revision and preparation for the new data*, Phys. Rev. D82 (2010) 123008 [arXiv: 1009.5243]
- [3] Y.Z.Ma, **W.Zhao** and M.Brown, *Constraints on standard and non-standard early Universe models from CMB B-mode polarization*, JCAP 10 (2010) 007 [arXiv:1007.2396]
- [4] **W.Zhao** and D.Baskaran, *Separating E and B types of polarization on an incomplete sky*, Phys. Rev. D82 (2010) 023001 [arXiv:1005.1201]
- [5] **W.Zhao**, D.Baskaran and L.P.Grishchuk, *Relic gravitational waves in the light of 7-year Wilkinson Microwave Anisotropy Probe data and improved prospects for the Planck mission*, Phys. Rev. D82 (2010) 043003 [arXiv:1005.4549]
- [6] **W.Zhao**, D.Baskaran and L.P.Grishchuk, *Stable indications of relic gravitational waves in Wilkinson Microwave Anisotropy Probe data and forecasts for Planck mission*, Phys. Rev. D80 (2009) 083005 [arXiv:0907.1169]
- [7] **W.Zhao** and D.Baskaran, *Detecting relic gravitational waves in the CMB: Optimal parameters and their constraints*, Phys. Rev. D79 (2009) 083003 [arXiv:0902.1851]
- [8] **W.Zhao**, *Detecting relic gravitational waves in the CMB: Comparison of different methods*, Phys. Rev. D79 (2009) 063003 [arXiv:0902.1848]
- [9] **W.Zhao**, D.Baskaran and L.P.Grishchuk, *On the road to discovery of relic gravitational waves: The TE and BB correlations in the cosmic microwave background radiation*, Phys. Rev. D79 (2009) 023002 [arXiv:0810.0756]
- [10] **W.Zhao** and W.Zhang, *Detecting relic gravitational waves in the CMB: Comparison of Planck and ground-based experiments*, Phys. Lett. B677 (2009) 16 [arXiv:0907.1453]
- [11] **W.Zhao**, Y.Zhang and T.Y.Xia, *New method to constrain the relativistic free-streaming*

gas in the Universe, Phys. Lett. B677 (2009) 235 [arXiv:0905.3223]

[12] **W.Zhao**, D.Baskaran and P.Coles, *Detecting relics of a thermal gravitational wave background from early Universe*, Phys. Lett. B680 (2009) 411 [arXiv:0907.4303]

[13] **W.Zhao**, *Perturbations of the Yang-Mills field in the Universe*, Research in Astronomy and Astrophysics 9 (2009) 874

[14] **W.Zhao**, *Attractor solution in coupled Yang-Mills field dark energy models*, Int. J. Mod. Phys. D18 (2009) 1331 [arXiv:0810.5506]

[15] Y.Zhang **W.Zhao** et al., *Relic gravitational waves and CMB polarization in accelerating Universe*, Int. J. Mod. Phys. D17 (2008) 1105 [arXiv:0806.2243]

[16] **W.Zhao**, *Statefinder diagnostic for Yang-Mills dark energy model*, Int. J. Mod. Phys. D17 (2008) 1245 [arXiv:0711.2319]

[17] **W.Zhao**, *Holographic hessence models*, Phys. Lett. B655 (2007) 97 [arXiv:0706.2211]

[18] Y.Zhang, T.Y.Xia and **W.Zhao**, *Yang-Mills dark energy coupled with matter and radiation*, Class. Quant. Grav. 24 (2007) 3309 [gr-qc/0609115]

[19] **W.Zhao** and D.H.Xu, *Evolution of magnetic component in Yang-Mills condensate dark energy models*, Int. J. Mod. Phys. D16 (2007) 1735 [gr-qc/0701136]

[20] **W.Zhao**, *Improved calculation of relic gravitational waves*, Chinese Physics 16 (2007) 1735 [gr-qc/0612041]

[21] **W.Zhao**, *Quintessence models with an oscillating equation of state and their potentials*, Chinese Physics 17 (2007) 2830 [astro-ph/0604459]

[22] **W.Zhao** and Y.Zhang, *Analytic approach to the CMB polarizations generated by relic gravitational waves*, Phys. Rev. D74 (2006) 083006 [astro-ph/0508345]

[23] **W.Zhao** and Y.Zhang, *Relic gravitational waves and their detection*, Phys. Rev. D74 (2006) 043503 [astro-ph/0604458]

[24] **W.Zhao** and Y.Zhang, *Coincidence problem in YM field dark energy model*, Phys. Lett. B640 (2006) 69 [astro-ph/0604457]

[25] **W.Zhao** and Y.Zhang, *Quintom models with an equation of state crossing -1*, Phys. Rev. D73 (2006) 123509 [astro-ph/0604460]

[26] **W.Zhao** and Y.Zhang, *The state equation of Yang-Mills field dark energy models*, Class. Quant. Grav. 23 (2006) 3405 [astro-ph/0510356]

- [27] Y.Zhang, X.Er, T.Xia, **W.Zhao** et al., *An exact analytic spectrum of relic gravitational waves in accelerating Universe*, Class. Quant. Grav. 23 (2006) 3783 [astro-ph/0604456]
- [28] Y.Zhang, Y.F.Yuan, **W.Zhao**, et al., *Relic gravitational waves in the accelerating Universe*, Class. Quant. Grav. 22 (2005) 1383 [astro-ph/0501329]
- [29] Y.Zhang, **W.Zhao** et al., *Numerical spectrum of relic gravitational waves in accelerating Universe*, Chin. Phys. Lett. 20 (2005) 1817 [astro-ph/0505589]
- [30] Y.Zhang, H.Hao and **W.Zhao**, *An approximate analytic formula for the polarization of cosmic microwave background radiation*, Chinese Astronomy & Astrophysics 29 (2005) 250
- [31] Y.Zhang, **W.Zhao** and Y.F.Yuan, *The gravitational waves sources in the Universe*, Publication of Purple Mountain Observatory 23 (2004) 53
- [32] Y.Zhang, **W.Zhao** and J.L.Han, *A test of the MOND theory and the model of dark matter*, Chinese Astronomy & Astrophysics 28 (2004) 9
- [33] **W.Zhao** and Y.Zhang, *Multi-pulsar cross-correlation method for detecting cosmic gravitational waves*, Acta Astronomica Sinica 44 (2003) 273

Papers in preparation

- [1] **W.Zhao**, *Detection of relic gravitational waves in the CMB: Prospects for CMBPol mission*, JCAP submitted
- [2] **W.Zhao** and Q.G.Huang, *Testing inflationary consistency relations by the potential CMB observations*, Phys. Rev. D submitted

Other Publications

- [1] **W.Zhao**, Y.Zhang and M.Tong, *Quantum Yang-Mills condensate dark energy models*, Chapter 5 of the Publication "Dark Energy: Theories, Developments and Implications" , NOVA Publishers, Eds: K.Lefebvre and R.Garcia [arXiv:0909.3874]
- [2] D.Baskaran, L.P.Grishchuk and **W.Zhao**, *Primordial gravitational waves and cosmic microwave background radiation*, A summary of Presentations delivered at OC1 Parallel session "Primordial Gravitational Waves and the CMB" of the 12th Marcel Grossmann Meeting on General Relativity (Paris, 12-18 July 2009) World Scientific Publisher, Eds: T.Damour, R.Jantzen and R.Ruffini [arXiv:1004.0804]

