Xin Wang

Personal Information

Date and Place of Birth:	September 1st, 1988 | Tianjin, China
Mailing Address:	3251 S. Sepulveda Blvd., Apt. 307, Los Angeles, CA 90034, the United States of America
E-mail, Cell and Skype Account:	albertfxwang@gmail.com | +1-805-574-0025 | albertfxwang
Current Status:	Graduate Student at University of California, Los Angeles

Education

Sept. 2015–Present | Department of Physics and Astronomy, UCLA | **Towards Ph.D. in Astrophysics (Jun. 2018)**
Field of Interest: Nebular Emission Spectroscopy, Strong Gravitational Lensing, Galaxy Clusters, Cosmology.
`Advisor: Prof. Tommaso Treu`

Sept. 2013–Sept. 2015 | Physics Department, UCSB | **M.A. in Physics with Astrophysics Emphasis (Jun. 2015)**
`Advisor: Prof. Tommaso Treu`; Cumulative Total (Grad) GPA: 3.96

Sept. 2010–May 2013 | School of Astronomy and Space Sciences, Nanjing University | **M.Sc. in Astrophysics (Jun. 2013)**
Field of Interest: Precision Cosmological Constraints, Galaxy Clusters, Primordial Power Spectrum.
`Advisors: Profs. Gong-Bo Zhao, Charling Tao, Tong-Jie Zhang, Y. F. Huang, Hu Zhan`

Sept. 2006–Jun. 2010 | Department of Astronomy, Nanjing University | **B.Sc. in Astronomy (Jun. 2010)**
Weighted Average Score: 84.64/100 (overall), 87.68/100 (major); Ranking: 2nd/26

Research Experience

Sept. 2013–Present

Title: The Grism Lens-Amplified Survey from Space (GLASS) Project

GLASS is a cycle-21 HST Large Program allocated 140 orbits of Grism spectroscopy assisted with HST optical and infrared imaging. We survey the core and infall regions of 10 dynamically relaxed, massive clusters, including 8 targeted by CLASH and 6 Frontier Fields. We will address three scientific questions: 1) What's the role that galaxies play in the process of reionization? 2) Why and how is galaxy evolution environmental dependent? 3) How do metals cycle in and out of galaxies and what's the interplay between cycling of metals and SF activities?

Project in progress and scientific products: Schmidt et al. (2014), Jones et al. (2015), Wang et al. (2015)

Sept. 2012–Aug. 2013

Title: Applications of the Non-Parametric Bayesian Method to Cosmological Reconstructions

We attempt to use the newly proposed non-parametric Bayesian method to reconstruct the evolution history of some crucial cosmological quantities, i.e., primordial perturbation power spectrum, dark energy equation of state, growth function. We believe that some unique abrupt features of the primordial power spectrum can be revealed by our method. With the help of Fisher formalism and principle component analysis, it is straightforward to forecast the possibility that those features can be detected by next generation projects, i.e., AS3, BigBOSS, Euclid, CMBPol.

Scientific Product: paper to be submitted

Feb. 2012–Oct. 2012

Title: Constraints on Cosmic Neutrinos and Dark Energy Revisited

Using various cosmological observations, i.e., CMB, weak lensing (WL), BAO, observational Hubble parameter data (OHD), type Ia supernovae (SNIa), we impose constraints on the sum of neutrino masses (Σm_ν), the effective number of neutrino species ($N_{\rm eff}$) and dark energy equation of state (w). We find that a tight upper limit on Σm_ν can be extracted if $N_{\rm eff}$ and w are fixed, however it will be severely weakened if $N_{\rm eff}$ and w are allowed to vary. This result raises questions on the robustness of previous strict upper bounds on Σm_ν, reported in the literature. The best-fits from our most generalized constraint read $\Sigma m_\nu = 0.556^{+0.231}_{-0.288}$eV, $N_{\rm eff} = 3.839 \pm 0.452$, and $w = -1.058 \pm 0.088$. The different constraining abilities of current WL, OHD and SNIa samples are assessed and compared.

Scientific Product: Wang et al. (2012)

Sept. 2011–Jan. 2012

Title: Using the Cosmic Distance-Duality Relation to Test the $f_{\rm gas}$ Measurements in Galaxy Clusters

We propose a new method to assess X-ray measurements of galaxy cluster gas fraction ($f_{\rm gas}$), via a combination of the Union2 SNIa compilation and the cosmic distance-duality relation, $\eta_{\rm theory} = D_{\rm L}(1+z)^{-2}/D_{\rm A} = 1$. Since in all previous estimations, $\eta_{\rm theory} = 1$ is readily assumed, we use this constraint to recover the cosmological information from a given set of $f_{\rm gas}$ data. Our results show that the $f_{\rm gas}$ sample of Ettori et al. 2009 is endowed with an $\Omega_\Lambda = 0$ reference cosmology, rather than the reported model ($\Omega_{\rm m} = 0.3, \Omega_\Lambda = 0.7$), which is excluded even at 3-σ confidence level.

Scientific Product: Wang et al. (2013)

Jan. 2011– *Title: Using the Test of the Distance-Duality Relation to Probe the Morphology of Galaxy Clusters*

Oct. 2011 | Aiming at probing the intrinsic morphology of galaxy clusters, we make a cosmological model-independent test of the cosmic distance-duality relation, $D_{\rm L}(1+z)^{-2}/D_{\rm A}=1$, by two new methods. The luminosity distances ($D_{\rm L}$) are obtained from the Union2 SNIa compilation. The angular diameter distances ($D_{\rm A}$) are provided by two cluster morphological models, which are elliptical β-model and spherical β-model. Our results support that the marked triaxial ellipsoidal model is a better geometrical hypothesis describing the structure of galaxy clusters compared with the spherical β-model.
Scientific Product: Meng et al. (2012)

Sept. 2008–Sept. 2009 | *Title: Investigation on the Emission from the Receding Jet of Gamma-Ray Bursts*
In a series of work, we have studied the dynamical evolution of double-sided jets launched by the central engine of GRBs and calculated the afterglow emission from both jet components. For the first time, we present a detailed numerical study on the afterglow contributed from the jet component receding from the observer, with the effects of synchrotron self-absorption and equal arrival time surface taken into account. It is found that the receding jet emission is generally very weak and only manifests as a plateau in the late time radio afterglow light curves. However the emission from the receding jet can be significantly enhanced and possibly detectable, if the circum-burst medium density is very high.
Scientific Product: Wang et al. (2009)

Publications and Activities

Academic Journals and Conference Contribution

1 **Wang, X.**, Huang, Y. F., & Kong, S. W. On the Afterglow from the Receding Jet of Gamma-Ray Bursts. 2009, *Astron. Astrophys.*, 505, 1213 (arXiv:0903.3119)
2 Meng, X.-L., Zhang, T.-J., Zhan, H., & **Wang, X.** Morphology of Galaxy Clusters: A Cosmological Model-Independent Test of the Cosmic Distance-Duality Relation. 2012, *Astrophys. J.*, 745, 98 (arXiv:1104.2833)
3 **Wang, X.**, Meng, X.-L. et al. Observational Constraints on Cosmic Neutrinos and Dark Energy Revisited. 2012, *J. Cosmol. Astropart. Phys.*, 11, 018 (arXiv:1210.2136)
4 **Wang, X.**, Meng, X.-L., & Huang, Y. F., Testing X-ray Measurements of Galaxy Cluster Gas Mass Fraction Using the Cosmic Distance-Duality Relation and Type Ia Supernovae. 2013, RAA, 13, 1013 (arXiv:1305.2077)
5 Schmidt, K. B., Treu, T., Brammer, G. B., Bradac, M., **Wang, X.** et al. Through the Looking GLASS: HST Spectroscopy of Faint Galaxies Lensed by the Frontier Fields Cluster MACSJ0717.5+3745. 2014, *Astrophys. J. Letters*, 782L, 36, (arXiv:1401.0532)
6 Jones, T., **Wang, X.** et al. The Grism Lens-Amplified Survey from Space (GLASS). II. Gas-Phase Metallicity and Radial Gradients in an Interacting System At z∼2. 2015, *Astron. J.*, 149, 107 (arXiv:1410.0967)
7 **Wang, X.**, Hoag, A., Huang, K.-H., Treu, T., Bradac, M., Schmidt, K. B. et al. The Grism Lens-Amplified Survey from Space (GLASS). IV. Mass reconstruction of the lensing cluster Abell 2744 from frontier field imaging and GLASS spectroscopy. 2015, *Astrophys. J.*, 811, 29 (arXiv:1504.02405)

Academic Activities

Apr. 2009 | **Presented a talk**, @ Frontiers of Space Astrophysics: Neutron Stars & Gamma Ray Bursts — Recent Developments & Future Directions, Cairo & Alexandria, Egypt

Jun. 2010 | **Presented a talk**, @ A mini-workshop on "Gamma-ray Sky from Fermi: Neutron Stars and their Environment", University of Hong Kong, Hong Kong

Nov. 2012 | **Presented a talk**, @ Tsinghua Transient Workshop 2012, Tsinghua University, Beijing

Aug. 2015 | **Presented a talk**, @ Focus Meeting 22 at XXIX IAU General Assembly, Honolulu, HI

English Proficiency

GRE General: 550 (69%, Verbal) + 800 (94%, Quantitative) + 4.0 (49%, Analytical Writing)
GRE Physics: 940 (91%)
TOEFL: 29 (Reading) + 30 (Listening) + 23 (Speaking) + 28 (Writing) = 110

Awards and Honors (selected)

Apr. 2015 AAS International Travel Grant ($1k)
Jun. 2014 1st Prize for Excellent M.Sc. Thesis amongst all Universities and Colleges in Jiangsu Province
Dec. 2012 National Scholarship for Graduates
This is the highest honorific scholarship within China conferred annually upon excellent graduate students.
Aug. 2010 1st Prize for Excellent B.Sc. Thesis amongst all Universities and Colleges in Jiangsu Province
Oct. 2009 Scholarship of National Astronomical Observatories, Chinese Academy of Sciences

Computer Skills

Python, MATLAB, FORTRAN, CosmoMC & CAMB, C, HEASoft, Origin Lab, Mathmatica, LaTeX, vim

Working Experience

Dec. 2010–Dec. 2011 — Organizer of Graduate Journal Club in School of Astronomy and Space Sciences, Nanjing University

In total, we have arranged 17 meetings, and invited 34 speakers, most of which are graduate students. The majority of the speakers come from our school, while we do have speakers from many other institutes, e.g., Purple Mountain Observatory, University of Science and Technology of China, University of Sydney. The topics are related to the major field of interest of the speakers, who will also share with participants some academic experience in doing scientific research. This activity is financially supported by our school.