ALIREZA HOJJATI

NSERC Postdoctoral Fellow
Department of Physics and Astronomy, University of British Columbia
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RESEARCH INTERESTS

Weak and Strong Lensing, Baryonic Physics in galaxies and AGN feedback, Dark Energy and Modified Gravity.

EMPLOYMENT

2013 - Present, Postdoctoral Fellow
Department of Physics and Astronomy, University of British Columbia, Vancouver, Canada.

2012 - 2013, Postdoctoral Research Associate
Institute for the early universe (IEU), Seoul, South Korea.

EDUCATION

2007 - 2012, PhD., Cosmology
Department of Physics, Simon Fraser University, Burnaby, Canada.

2003 - 2006, M.Sc., Particle Physics
Department of Physics, Isfahan University of Technology, Isfahan, Iran.

1999 - 2003, BSc., Physics
Department of Physics, Isfahan University of Technology, Isfahan, Iran.

AWARDS/ HONORS

NSERC Postdoctoral Fellowship, UBC, 2014-2016.

Billy Jones Graduate Award in Physics, SFU, 2011.

Research travel award, SFU, 2010, 2011, 2012.

Graduate fellowship, SFU, 2010, 2011, 2012.

Conference scholarship, CAANDY, Denmark, 2013; CAM2011, Washington DC, 2011 (Declined); Essential Cosmology for Next Generation, Mexico, 2010; 7th Constantine High Energy Physics school, Algeria, 2004.

President research stipend, SFU, 2009.

Best seminar award, SFU, 2008.

Best graduate presentation award, SFU, 2008.

First-rank elite student by "Iranian national elites foundation", 2006.

Best M.Sc. student, Physics Department, IUT, 2006.

Top B.Sc. student, Physics Department, IUT, 2003.

COMPUTATION TOOLS

Programming Languages: Python, Fortran, Bash, R, MATLAB & IDL

Development: MySQL, HTML &CSS

MGCAMB : Developed MGCAMB code and accompanying MGcosmoMC packages for modified gravity studies.

Gaussian Processes: Applied Gaussian Processes techniques to classify, reconstruct and predict properties of astrophysical objects.

Machine learning: Used machine learning tools to analyze large simulated data sets of quasar light curves in the Strong Lens Time Delay Challenge.

Data reduction: Applied methods such as Principal Component Analysis (PCA), Wavelets analysis, etc to compress and store cosmological information from large and noisy data sets.

TEACHING EXPERIENCE

Lecturer: Universe and Life; Analytical Mechanics & Quantum Physics; Undergraduate Physics (PHYS 100-level).

Substitute lecturer: Special Topics, Relativity and Gravitation (PHYS 881); Advanced Mechanics (PHYS 413); Electromagnetic Theory (PHYS 821); Intermediate Mechanics (PHYS 211); Introduction to Astrophysics (PHYS-390), 2010-2013.

Instructor: Software Carpentry, 2015.

Instructional Skills Workshop (ISW), 2009.

Certificate Program in University Teaching & Learning, 2009.

Teaching assistant: Electromagnetic Theory (PHYS 821), PHYS 100-200, 2007-2011.

Teacher: High school Physics & Mathematics, 2003-2004.

STUDENT CO-SUPERVISON

PhD thesis : Alex Zucca 2015, Yun Li, SFU, 2013-2015.

M.Sc. thesis : Aaron Plahn, SFU, 2013-2014, Hasmik Hayrapetian, SFU, 2011.

USRA research project : Starla Talbot, SFU, 2010, 2012.

TALK/ PRESENTATION

Weak lensing, thermal SZ effect and baryons , "Accurate astrophysic, Correct cosmology" workshop, Royal Astronomical Observatory, London,UK, 2015.

Weak lensing cross correlation with thermal SZ effect : Implications for ICM gastrophysics and galaxy-galaxy lensing , CITA, Toronto, Canada, 2015.

Probing the diffuse baryon distribution with the cross-correlation between lensing and the thermal Sunyaev-Zeldovich effect", NAOC, Beijing, China 2014.

Strong lensing and time-delay measurements, IEU, Seoul, Korea, 2013.

Lyman-alpha forest as a cosmological probe, SFU, Vancouver, Canada, 2012.

Cosmological Tests of General Relativity, COSMO12, Beijing, China, 2012.

Applications of Principal Component Analysis to Cosmological Tests of General Relativity, ICG, Portsmouth, UK, 2011.

Cosmological Tests of GR with Linear Growth of Structure, U. o. Manchester, UK, 2011.

Model-independent tests of linear growth of large scale structure, IAS, Princeton, USA, 2011.

Entanglement theory and second law of Thermodynamics, SFU, 2010.

Detecting Features in the Dark Energy Equation of State: A Wavelet Approach, 11th Annual APS meeting, Vancouver, 2009.

Microfiber-nanowire hybrid structure for energy scavenging, SFU, 2009.

Standard Model of Cosmology and Inflationary Universe, IUT, 2004.

Model-Independent Tests of Cosmic Acceleration, Essential Cosmology for Next Generation, Puerto Vallarta, Mexico, 2011.

Detecting Features in the Dark Energy Equation of State: A Wavelet Approach, SFU, 2010.

Generation of large scale magnetic fields by coupling to curvature and dilaton field, SFU, 2008.

OTHER CONFERENCES/ WORKSHOPS

Invited visitor, The Institute for Astronomy, Royal Observatory, Edinburgh, UK, 2015.

Invited visitor, ICG, Portsmouth, UK, 2015.

Copenhagen-Asia-America Network for Dark cosmologY (CAANDY) workshop, Copenhagen, Denmark, 2013.

Invited visitor, Lawrence Berkeley National Labs, Berkeley, USA, 2013.

DEUS workshop, Copenhagen, Denmark, 2011.

Frontiers of Physics in Cosmology (PiTP), IAS, Princeton, USA, 2011.

Essential Cosmology for Next Generation , Puerto Vallarta, Mexico, 2011.

Cosmological Frontiers in Fundamental Physics, Perimeter Institute, Waterloo, 2010.

TEXAS 2008, Vancouver, 2008.

PASCOS 08, Perimeter Institute, Waterloo, 2008.

OUTREACH

Organizer, Software Carpentry workshop, Vancouver, 2015.

Organizer, Scientific Programming Study Group, SFU, 2015.

Organizer, Testing Gravity 2015, Vancouver, 2015.

Organizer, SFU-UBC-TRIUMF meetings, SFU, 2012-2015.

Host, TRIUMF Saturday morning lecture series, SFU, 2012.

Laser workshop series, SFU, 2011.

Science in Action series, SFU, 2009-2011.

Starry Nights workshop series, SFU, 2009-2010. *Starry Nights workshop series*, SFU, 2009-2010.

Physics student association, IUT, 2000-2005.

PUBLICATIONS **In progress:**

A. Hojjati et al.,
Cross-correlation of Planck tSZ and RCSLenS Galaxy Weak Lensing Maps: Implications for ICM Baryonic Physics and Cosmology

B. Moraes et al.,
The thermal Sunyaev-Zel'dovich emission of SDSS DR8 redMaPPer galaxy clusters

H. Tanimura et al.,
Estimate of Electron Density and Temperature in Filaments between SDSS Luminos Red Galaxies

Published:

J. Harnois-Deraps, T. Troster, **A. Hojjati** et al.,
RCSLenS: CFHTLenS and RCSLenS Cross-Correlation with Planck Lensing Detected in Fourier and Configuration Space
arXiv:1603.07723 (Submitted to MNRAS).

H. Hildebrandt et al.,
RCSLenS: The Red-sequence Cluster Lensing Survey
arXiv:1603.07722 (Submitted to MNRAS).

A. Hojjati et al.,
Searching for Scalar Gravitational Interactions in Current and Future Cosmological Data
Phys. Rev. D 93, 043531, arXiv:1511.05962.

G.B. Zhao et al.,
The extended Baryon Oscillation Spectroscopic Survey (eBOSS): a cosmological forecast
MNRAS 457 (2016) 2377, arXiv:1510.08216.

A. Hojjati & E. V. Linder,
CMB Lensing and Scale Dependent New Physics
Phys. Rev. D 93, 023528, arXiv:1507.08292.

A. Hojjati, et al,
Dissecting the thermal Sunyaev-Zeldovich-gravitational lensing cross-correlation with hydrodynamical simulations,
JCAP10(2015)047, arXiv:1412.6051.

K. Liao et al,
Strong Lens Time Delay Challenge: II. Results of TDC1 ,
ApJ, 800, 11, arXiv:1409.1254.

A. Hojjati & E. V. Linder,
Next Generation Strong Lensing Time Delay Estimation with Gaussian Processes ,
Phys.Rev. D90 (2014) 123501, arXiv:1408.5143.

Y.Z. Ma, L. Van Waerbeke, G. Hinshaw, **A. Hojjati** & D. Scott,
Probing the diffuse baryon distribution with the lensing-tSZ cross-correlation,
2015, JCAP, 09, 046, arXiv:1404.4808.

A. Hojjati, L. Pogosian, A. Silvestri & G.B. Zhao,
Observable physical modes of modified gravity,
Phys. Rev. D 89, 083505 (2014), arXiv:1312.5309.

G. Dobler, C. Fassnacht, T. Treu, P. J. Marshall, K. Liao, **A. Hojjati**, E. Linder & N. Rumbaugh, *Strong Lens Time Delay Challenge: I. Experimental Design*,
ApJ, 799, 168, arXiv:1310.4830.

S. Asaba, C. Hikage, K. Koyama, G. Zhao, **A. Hojjati** & L. Pogosian,
Principal Component Analysis of Modified Gravity using Weak Lensing and Peculiar Velocity Measurements,
JCAP08(2013)029, arXiv:1306.2546.

A. Hojjati, E. V. Linder & Johan Samsing,
New constraints on the early expansion history,
Phys. Rev. Lett 111, 041301 (2013), arXiv:1304.3724.

A. Hojjati, A. G. Kim & E. V. Linder,
Robust Strong Lensing Time Delay Estimation ,
Phys. Rev. D 87, 123512 (2013), arXiv:1304.0309.

Y. Wang, D. Wands, L. Xu, J. De-Santiago & **A. Hojjati**,
Cosmological constraints on a decomposed Chaplygin gas,
Phys. Rev. D 87, 083503 (2013), arXiv:1301.5315.

A. Hojjati,
Degeneracies in parametrized modified gravity models,
JCAP01(2013)009, arXiv:1210.3903.

A. Hojjati, L. Pogosian, A. Silvestri & S. Talbot,
Practical solutions for perturbed $f(R)$ gravity,
Phys. Rev. D 86, 123503 (2012), arXiv:1210.6880.

A. Hojjati, G. Zhao, L. Pogosian, A. Silvestri, R. Crittenden & K. Koyama,
Cosmological tests of General Relativity: a principal component analysis,
Phys. Rev. D 85, 043508 (2012), arXiv:1111.3960.

A. Hojjati, L. Pogosian & G. Zhao,
Testing gravity with CAMB and CosmoMC,
JCAP 1108:005, arXiv:1106.4543.

A. Hojjati, L. Pogosian & G. Zhao,
Detecting Features in the Dark Energy Equation of State: A Wavelet Approach,
JCAP04(2010)007, arXiv:0912.4843v1.

A. Akhtari Zavareh, **A. Hojjati** & B. Mirza,
Generation of large scale magnetic fields by coupling to curvature and dilaton field,
Prog.Theor.Phys.117:803-822 (2007) arXiv:0707.3493v1 .