José Alberto Vázquez G. | Instituto de Ciencias Físicas - UNAM

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Current Position

Instituto de Ciencias Físicas - UNAM. **Morelos, MX**
Investigador Asociado C, de Tiempo Completo. *2017 -*

Member of the SDSS-III/SDSS-IV collaboration. [1]

Research Interests

BAO, CMB, Lyman-α forest; Dark Energy, Inflation; Data analysis. Website, LinkedIn, GitHub
. http://www.cosmo.bnl.gov/www/jvazquez/

Place and Birth date

Cuernavaca, Morelos México. 06-Septiembre-1982.

Education and Work Experience

Centro de Investigación y de Estudios Avanzados [CINVESTAV] del IPN. **CDMX, MX**
Catedrático CONACYT. *2016 - 2017*

Brookhaven National Lab [BNL], U.S. Department of Energy. **NY, USA**
Post-doctoral Research Associate, Prof. A. Slosar. *2013-2016*
"Cosmological Implications of BAO measurements and Lyman-α forest analysis"

KICC, University of Cambridge. **Cambridge, UK**
Ph.D. in Astrophysics, Prof. A. Lasenby and Prof. M. Hobson. *2009-2013*
"Constraining alternative cosmological models with current and future observations".

DAMTP, University of Cambridge. **Cambridge, UK**
MASt. in Mathematics, Dr. A. Challinor. *2008-2009*
"Constraining cosmological Inflation".

Physics Department, CINVESTAV. **DF, MX**
M.Sc. in Physics, Prof. T. Matos. *2005-2007*
"Dynamical systems in Scalar Field Cosmologies".

Faculty of Sciences, UAEM. **Morelos, MX**
B.Sc. in Physics, Prof. T. Matos. *2000-2005*
"Galaxy formation with scalar-field dark matter".

Research Internships

Physics Department, CINVESTAV. **DF, MX**
Visiting Researcher, hosted by Prof. T. Matos. *Jun-Oct.13'*

Acronyms: Sloan Digital Sky Survey [SDSS], Baryon Acoustic Oscillations [BAO], Cosmic Microwave Background [CMB].

Collaboration visit to give a lecture on 'General cosmology', and mentor three master students in their summer projects.

Physics Department, CINVESTAV. **DF, MX**
Graduate Research Assistant, hosted by Prof. T. Matos. *2007-2008*
"Cosmological models with dynamical systems".

Friedrich-Schiller-Universitat Jena. **Jena, DE**
Short-term research visitor, hosted by Prof. B. Brugmann. *Jun-Sept.06'*
"Numerical methods in Cosmology".

Selected Awards & Scholarships

2016: Joven Investigador Catedras CONACYT. [2]
2015: Invited for a plenary talk on behalf of the BOSS collaboration to the APS meeting.
2014: Invited for a plenary talk on behalf of the BOSS collaboration to the SDSS-IV meeting.
2013: Member of the National System of Researchers, Level 1 (SNI 1).
2013: PhD award for academic purposes, Cavendish Laboratory, Cambridge.
2012: Tutorial award for academic purposes, St Edmund's College, Cambridge.
2012: American Alumni award, for traveling to the US for studies. St Edmund's College, Cambridge.
2008-2012: SEP Excellence program scholarship, complementary scholarship.
2008-2012: CONACyT full scholarship, for study towards a MASt and PhD, University of Cambridge.
2006: Research grant for young scientists. *Awarded by the German Academic Exchange Service (DAAD).*
2005-2007 : CONACyT full scholarship, for study towards a Master, CINVESTAV.
2004-2005: Undergraduate Research Assistantship (from SNI-III tutor), UAEM-CINVESTAV.
2004 : Undergraduate Teaching Assistantship, UAEM.

Press Release

07.2016: US Department of Energy: Dark Energy Measured With Record-Breaking Map of 1.2 Million Galaxies. link
07.2016: LBNL, Berkeley Lab: Dark Energy Measured with Record-Breaking Map of 1.2 Million Galaxies. link.
07.2016: Physicsworld: Dark-energy study maps 1.2 million galaxies in the early universe. link.
04.2015: APS meeting on behalf of the BOSS Collaboration. link
06.2012: Talented Mexicans abroad. TV. short interview (Televisa).

Affiliations

2017 –: Referee of ApJ.
2015 –: Member of the APS, AAS.
2014 –: Member of the Advisory Committee for CONACYT projects (RCEA), by invitation.
Referee of projects: 'Installation of a high energy and astroparticle lab', asking for $US 300k; and 'Physics and astrophysics of neutron stars', asking for $US 200k.

Acronyms: Baryon Oscillation Spectroscopic Survey [BOSS], American Physical Society [APS], American Astronomical Society [AAS], Lawrence Berkeley National Laboratory [LBNL], Data Release 20* [DR*].

2013 –: Member of the SDSS-III/SDSS-IV collaboration, as part of the BOSS/eBOSS experiment.

2012 –: Committee member of the Mexican Cambridge Society.

2006 –: Member of the Institute advanced of cosmology, `http://www.iac.edu.mx/`

2004 –2005: Counselor student at Graduate Internal Council, UAEM.

Publications

For further details and citations: inspirehep (Cites:1134)

[28] - The Fourteenth Data Release of the Sloan Digital Sky Survey: First Spectroscopic Data from the extended Baryon Oscillation Sky Survey and from the second phase of the Apache Point Observatory Galactic Evolution Experiment: Bela Abolfathi et al.

Arxiv: 1707.09322, Submitted to ApJS

[27] - Galaxy-galaxy lensing estimators and their covariance properties:: Sukhdeep Singh, Rachel Mandelbaum, Uroš Seljak, Anže Slosar, JAV.

ArXiv:1611.00752, MNRAS, Vol 471, 4, 11 Nov 2017

[26] - The clustering of galaxies in the completed SDSS-III Baryon Oscillation Spectroscopic Survey: cosmological analysis of the DR12 galaxy sample: Shadab Alam *et al.*

ArXiv:1607.03155, MNRAS 470 (2017) no.3, 2617-2652

[25] - Sloan Digital Sky Survey IV: Mapping the Milky Way, Nearby Galaxies, and the Distant Universe: Michael R. Blanton *et al.*

ArXiv:1703.00052, Astron.J. 154 (2017) 28

[24] - Measurement of BAO correlations at $z = 2.3$ with SDSS DR12 Lya-Forests: Julian E. Bautista *et al.*

ArXiv:1702.00176, AA 603, A12 (2017)

[23] - The clustering of galaxies in the completed SDSS-III Baryon Oscillation Spectroscopic Survey: Examining the observational evidence for dynamical dark energy: Gong-Bo Zhao *et al.*

ArXiv:1701.08165, Nature Astronomy, 1, 627-632, (2017)

[22] - Constraining the dark energy equation of state using Bayes theorem and the Kullback-Leibler divergence: S. Hee *et al.*

ArXiv:1607.00270, MNRAS 466 (2017) no.1, 369-377

[21] - The clustering of galaxies in the completed SDSS-III Baryon Oscillation Spectroscopic Survey: combining correlated Gaussian posterior distributions: Ariel G. Sanchez *et al.*

ArXiv:1607.03146, MNRAS 464 (2): 1493-1501

[20] - The clustering of galaxies in the completed SDSS-III Baryon Oscillation Spectroscopic Survey: Baryon Acoustic Oscillations in Fourier-space: Florian Beutler *et al.*

ArXiv:1607.03149, MNRAS 464 (3): 3409-3430

[19] - The Thirteenth Data Release of the Sloan Digital Sky Survey: First Spectroscopic Data from the SDSS-IV Survey MApping Nearby Galaxies at Apache Point Observatory: Franco D. Albareti *et al.*

ArXiv:1608.02013, Submitted to ApJS

[18] -The clustering of galaxies in the completed SDSS-III Baryon Oscillation Spectroscopic Survey: double-probe measurements from BOSS galaxy clustering & Planck data – towards an anal-

ysis without informative priors : Marcos Pellejero-Ibanez *et al.*
ArXiv:1607.03152, MNRAS. 468 (2017) no.4

[17] - The Clustering of Galaxies in the Completed SDSS-III Baryon Oscillation Spectroscopic Survey: single-probe measurements from DR12 galaxy clustering – towards an accurate model: Chia-Hsun Chuang *et al.*
ArXiv:1607.03151, MNRAS, Vol 471, 2, 21 Oct 2017

[16] - Hybrid Natural Inflation: Graham G. Ross, Gabriel German, JAV.
ArXiv:1601.03221, JHEP 1605 (2016) 010

[15] - Large-scale clustering of Lyman-alpha emission intensity from SDSS/BOSS: Rupert A.C. Croft *et al.*
ArXiv:1504.04088, MNRAS 457 (4): 3541-3572.

[14] - Cosmological Implications of baryon acoustic oscillation (BAO) measurements: Éric Aubourg *et al.*
ArXiv:1411.1074, Phys. Rev. D92 (2015) no.12, 123516

[13] - Broadband distortion modeling in Lyman-α forest BAO fitting: Michael Blomqvist *et al.*
ArXiv:1504.06656, JCAP 1511 (2015) no.11, 034

[12] - The Eleventh and Twelfth Data Releases of the Sloan Digital Sky Survey: Final Data from SDSS-III: Shadab Alam *et al.*
ArXiv:1501.00963, ApJs 219 (2015) 1, 12

[11] - A divergence-free parametrization for dynamical dark energy: Ozgur Akarsu, Tekin Dereli, JAV.
ArXiv:1501.07598, JCAP, 1506 (2015) 06, 049

[10] - Constraining Hybrid Natural Inflation with recent CMB data: JAV, Mariana Carrillo, Gabriel German, Alfredo Herrera, J.C. Hidalgo.
ArXiv:1411.6616, JCAP 1502 (2015) 02, 039

[9] - Constraints on the Tensor-to-Scalar ratio for non-power law models: JAV, M. Bridges, Yin-Zhe Ma, M.P. Hobson.
ArXiv:1303.4014, JCAP 08(001) 2013

[8] - Reconstruction of the Dark Energy equation of state: JAV, M.P. Hobson, M. Bridges, A.N. Lasenby.
ArXiv:1205.0847, JCAP, 09(020), 2012

[7] - Reciprocity invariance of the Friedmann equation, missing matter and double dark energy: JAV *et al.*
ArXiv:1208.2542, Submitted to PRD

[6] - Model selection applied to reconstruction of the Primordial Power Spectrum: JAV, M.P. Hobson, M. Bridges, A.N. Lasenby.
ArXiv:1203.1252, JCAP 006(106), 2012

[5] - A Bayesian study of the primordial power spectrum from a novel closed universe: JAV, A.N. Lasenby, M.P. Hobson, M. Bridges.
ArXiv:1103.4619, MNRAS 422, 1948-1956, 2011

[4] - Dynamics of scalar field dark matter with a cosh potential: Tonatiuh Matos, José-Rubén Luévano, Israel Quiros, L. Arturo Urena-López, JAV.
ArXiv:0906.0396, PRD 80, 123521, 2009

[3] - Self-interacting Scalar Field Trapped in a Randall-Sundrum Braneworld: Tamé González, Tonatiuh Matos, Israel Quiros, JAV.
ArXiv:0812.1734, PLB 676, 161-167, 2009

[2] - ϕ^2 as Dark Matter:
Tonatiuh Matos, JAV, Juan Magana.
ArXiv:0806.0683, MNRAS 393, 1359-1369, 2008

[1] - An alternative Interpretation for the Moduli Fields of the Cosmology Associated to Type IIB Supergravity with Fluxes: Tonatiuh Matos, José-Rubén Luevano, Hugo Gracía Compeán, JAV.
ArXiv:0511098, IJMPA 23, 1949-1962, 2008

Conference Proceedings

[1C] Cosmological Implications of baryon acoustic oscillation (BAO) measurements:
Jose Vazquez. APS 6 No 4 (2015)

[2C] Study of Several Potentials as Scalar Field Dark Matter Candidates: Tonatiuh Matos, JAV, Juan Magana. AIP Conf. Proc. 1083, 144-170, 2008. AIP, 808386

[3C] Alternative interpretation for the moduli fields of string theories: Tonatiuh Matos, José Rubén Luevano, L. Arturo Urena, JAV. J. Phys. Conf. Ser. 91, 012014, 2007. JP, 773227

Reviews

[1R] Dark matter in the Universe: goals and challenges: JAV, Tonatiuh Matos. Rev. Mex. de Física E. 54, 193-202, 2008. RMF, 1870-3542

[2R] Constraining Cosmological Inflation: JAV, Tonatiuh Matos. Rev. Mex. Fis. E.

In Preparation (link)

[1p] Early Dark Energy: Reality and Fiction:
JAV, Anže Slosar, Hee-Jong Seo, David Weinberg. Link

[2p] Gaussian Embedding – massively parallelizable sampling algorithm.:
JAV, Anže Slosar, Andreu Font-Ribera, Patrick McDonald. Link

[3p] Cosmological constraints on Modified Gravity:
JAV, M.P. Hobson, A.N. Lasenby, M. Bridges. Link

[4p] Fourier-law for deceleration parameter.: Ozgur Akarsu, Tekin Dereli, Suresh Kumar, JAV.

Invited Talks

08.2017: Scalar Field Dark Matter. Queretaro, MX
02.2017: A simplistic description of the current Universe. CINVESTAV, DF, MX
01.2017: Observational Cosmology: Constraining our Universe. UNAM, Morelos, MX
02.2016: The current status of the Universe. Science Center, NY, US
04.2015: Cosmological implications of BAO measurements: BOSS DR11. APS, MD, US
Plenary talk on behalf of the BOSS Collaboration

04.2015: Gaussian Embedding algorithm and the BAO. CMU, PA, US
03.2015: Cosmology with BAO measurements. Aspen, CO, US
02.2015: The current status of the Universe. Koc University, Istanbul, TR
02.2015: The standard cosmological model: LCDM. ITU, Istanbul, TR
01.2015: Gaussian Embedding algorithm and the SimpleMC code. Berkeley, CA, US
12.2014: Cosmological Implications of BAO measurements. SDSS Meeting, NM, US
Plenary talk on behalf of the BOSS Collaboration
10.2014: BAO implications on Dark Energy constraints. BNL, NY, US
08.2013: Model Selection applied to Dark Energy models. UNAM, MX
09.2013: Dark Energy: Cosmological constant and other alternatives. CINVESTAV, MX
04.2012: Comparison of Cosmological Models with current Observations. Cambridge, UK

Talks-(past five years)

10.2015: The current status of the Universe. BNL, NY, US
06.2014: BAO in the Ly-α forest of BOSS DR11 quasars. BNL, NY, US
09.2013: Dark Energy: Cosmological constant and other alternatives. CINVESTAV, MX
09.2013: Model Selection applied to Dark Energy models. UNAM, MX
09.2013: Energía oscura: alternativas a la constante cosmológica. INAOE, Puebla, MX
02.2013: Constraining alternative models with future observations. IF, UNAM, MX
04.2012: Comparison of Cosmological Models with current Observations. Cambridge, UK
01.2011: An overview of Statistical Cosmology. ININ, MX
01.2011: Constraining cosmological models with current data. CINVESTAV, MX
04.2010: Comparing a novel closed Universe model with CMB data. KICC, Cambridge, UK

Hacking

08.2016: PyData. Chicago, IL, US
07.2016: PyGotham. UN, NY, US
07.2016: Database Camp. NY, US
06.2016: 8th Astronomical Data Analysis Summer School. Chania, GR
01.2015: Symposium and Hack Week on data-intensive cosmology. Berkeley, CA, US
04.2015: SciCoder 6 Workshop. NY, US

Travel grants

06.2016: Summer School in Statistics for Astronomers. Penn State, PA, US
05.2016: Statistical Challenges in 21st Century Cosmology. Chania, GR
04.2015: American Physical Society Meeting. MD, US
08.2014: Workshop on Cosmology from Baryons at High Redshift. Trieste, IT
08.2014: Collaboration Meeting. Cambridge, UK
07.2014: SDSS-III and SDSS-IV Collaboration. Salt Lake City, UT, US
01.2014: Essential Cosmology for the next Generation. Cabo, MX
10.2013: Precision Astronomy with Fully Depleted CCDs. BNL, NY, USA

08.2013: Segunda reunión de estudiantes de Astronomía. INAOE, Puebla, MX
07.2013: Statistical methods applied to modern cosmology. UNAM, MX
05.2012: Testing General Relativity with Astrophysical Systems. Harvard, MA, US
07.2011: New Horizons for High Redshifts. Cambridge, UK
07.2011: PASCOS 2011. Cambridge, UK
01.2011: Essential Cosmology for the Next Generation. Jalisco, MX
12.2010: Fourth TRR33 Winter School. Passo del Tonale, IT
07.2008: Summer school in Cosmology. ICTP, Trieste, IT
05.2008: III International Meeting on Gravitation and Cosmology. Morelia, MX
09.2007: Latin-American School of Physics. DF, MX
08.2007: XXXV SLAC Summer Institute. Stanford, CA, USA
06.2007: International Conference on Quantum Gravity. Morelia, MX
07.2006: New Frontiers in Numerical Relativity. AIE, Berlin, DE
07.2004: XIII Summer at the National Astronomic Observatory. Ensenada, MX

Domestic

08.2009: Cluster de Alto desempeno. UAEH, Hidalgo, MX
02.2008: 1er Congreso de Cosmología. IFUG, MX
09.2007: 2a Reunión del Instituto Avanzado en Cosmología. CRyA-UNAM, MX
07.2007: Advanced Summer School in Physics. CINVESTAV, MX
04.2007: XV Reunión anual de la división de Gravitación y Física Matemática. IPN, MX
01.2007: Obregón Fest. IFUG, MX
01.2007: 1era Reunión Instituto Avanzado de Cosmología. UNAM, MX
11.2006: VII Mexican School on Gravitation. Playa del Carmen, MX
04.2006: XIV Reunión Anual de la División de Gravitación y Física. CINVESTAV, MX
07.2005: IV Mexican School of Astrophysics [EMA] 05. Morelia, MX
09.2003: 3rd. Workshop Optica Moderna. INAOE, Puebla, MX
08.2003: XI Summer School on Physics, La visión molecular de la materia. UAEM, Morelos, MX
08.2002: X Summer School on Physics, La visión molecular de la materia. UAEM, Morelos, MX

Organization

07.2017: Advanced Summer School. CINVESTAV-IPN, MX
06.2017: XXV Reunion de la Division de Gravitacion y Fisica Matematica. CINVESTAV-IPN, MX
03.2017: Workshop Organiser: Statistical and Numerical methods in Cosmology. CINVESTAV, MX
09.2013: Workshop Organiser: Statistical and Numerical methods in Cosmology. IF, UNAM, MX
01.2011: Mini-workshop Organiser: overview to CAMB and CosmoMC. ININ, MX
2007-2008: Seminar Organiser, “Geometry and Gravitation”. CINVESTAV, MX
2005-2007: Seminar Organiser, “Cosmology, Astrophysics and Numerical R”. CINVESTAV, MX
2004-2005: Committee Member, “Consejo Técnico”. UAEM, MX
2004-2005: Committee Member, “Consejo Estudiantil de la Sociedad de Alumnos”. UAEM, MX
2001-2002: Committee Member, “Consejo Estudiantil de la Sociedad de Alumnos”. UAEM, MX

Teaching and Outreach

08.2017: Introduction to the Modern Cosmology, postgraduate course, CINVESTAV.

06.2017: Mathematical Methods, Master program, CINVESTAV.

08.2016: Mentoring a summer high school student, BNL.

10.2015: Mentoring a summer high school student, BNL.

07.2013: Tutor of three Master summer students, CINVESTAV.

2006 : Graduate Research Assistant, *Photo Acoustic Spectroscopy*, CINVESTAV.

2004-2005: Undergraduate Research Assistantship,*Galaxy Formation with dark matter*, UAEM.

2004 : Undergraduate Teaching Assistant, *Mechanics Subject*, UAEM.

2003-2004: Undergraduate Research Assistantship,*Opto-galvatinic spectroscopy of plasmas to low temperature*, UAEM.

Skills and Interests

Programming Languages: Python, C/C++, Fortran, R, Bash Scripting

Maths: Maple, Mathematica, Matlab (basic)

Op. Systems: Linux, Windows, Mac OS X

Design: Latex, HTML, CSS

Databases: MySQL, SQLite

Useful: Gnuplot, Git, SVN

Packages, libraries and frameworks

Python: Numpy, Pandas, Scipy, Scikit-learn, Beatiful Soup, Matplotlib, Bokeh, Seaborn, Flask.

R: dplyr, Main ones for Stats and ML, ggplot2, Shiny

C/C++, Fortran: LAPACK, OpenMP, MPI

HPC Clusters: NERSC(LBNL), Astro (BNL), Darwin (Cambridge), LaSuma-(CINVESTAV) [3]

Cosmology codes

CAMB, CosmoMC, MultiNest, CosmoNet, CosmoSIS, SimpleMC.

Contributions: MCMC for BAO analysis for the BOSS collaboration (Python) - SimpleMC
. Massively parallelizable Gaussian Embedding Sampling (Python) - GM algorithm
. Model Independent Bayesian Reconstruction (Fortran) - NP-CAMB
Lyman-α analysis for the BOSS collaboration (C++) - Cosmology

Non-Academic Projects

Scraping the web, Using APIs, Data manipulation with Pandas and SQL, Playing with Stats and Machine Learning algorithms and Visualizations.

Meetups: Regularly attending NYC meetups with keywords such as Python, R, SQL, Data science.

For further details see: GitHub, Bitbucket.

Others

Languages: Spanish (Native); English (Fluent); German (Elementary).

Acronyms: High Performace Computing [HPC], Application Programming Interface [API], Structured Query Language [SQL], Markov chain Monte Carlo [MCMC].

Sports: Football (participation on national tournaments), Squash, Climbing, Jogging, Cycling. Organiser of the national football tournament of Mexican Societies in UK (05.2010).

Others: Reading: Economy, Science, Science Fiction; Board games: Chess, Backgammon, Poker.

References

Anže Slosar — **Brookhaven National Lab**
Upton, 11973, NY, US. Tel: +1 (631) 344 8012. — *anze@bnl.gov*

Mike Hobson — **University of Cambridge**
Cavendish Laboratory, CB3 0HE, UK. Tel: +44 1223 339992. — *mph@mrao.cam.ac.uk*

Anthony Lasenby — **University of Cambridge**
Kavli Institute for Cosmology, CB3 0HA, UK. Tel: +44 1223 337293. — *a.n.lasenby@mrao.cam.ac.uk*

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