

Current Research

The application of the BAO technique to large cosmological surveys has enabled the first percent-level measurements of absolute distances beyond the Milky Way. In combination with CMB and SN data, these measurements yield impressively tight constraints on the cosmic expansion history and correspondingly stringent tests of dark energy theories. Over the next year, the strength of these tests will advance significantly with the final results from BOSS and the CMB polarization and improved temperature maps from Planck. In the longer term, BAO measurements will gain in precision and redshift range through a multitude of ongoing or planned spectroscopic surveys, including SDSS-IV eBOSS, HETDEX, DESI, WEAVE, Euclid, and WFIRST.

Interests BAO, CMB, Ly- α forest; Dark Energy, Inflation; Data analysis.

[Website](#), [LinkedIn](#), [GitHub](#)

Education and Working Experience

- Oct.2013 - **Post-doctoral Research Associate**, *Brookhaven National Lab, NY, USA.*
“Cosmological Implications of BAO measurements and Lyman- α forest analysis”
Member of the SDSS-III/SDSS-IV collaboration. Dr. A. Slosar
- 2009-2013 **Ph.D. in Astrophysics**, *KICC, University of Cambridge, UK.*
“Constraining alternative cosmological models with current and future observations”.
Prof. A. Lasenby and Prof. M. Hobson.
- 2008-2009 **MASt. in Mathematics**, *DAMTP, University of Cambridge, UK.*
“Constraining cosmological Inflation”. Dr. A. Challinor
- 2005-2007 **M.Sc. in Physics**, *Physics Department, CINVESTAV, MX.*
“Dynamical systems in Scalar Field Cosmologies”. Prof. T. Matos.
- 2000-2005 **B.Sc. in Physics**, *Faculty of Sciences, UAEMor, MX.*
“Galaxy formation with scalar-field dark matter”. Prof. T. Matos.

Research Internships

- Jun-Oct.13' **Visiting Researcher**, *Physics Department, CINVESTAV, MX.*
Prof. T. Matos.
- 2007-2008 **Graduate Research Assistant**, *Physics Department, CINVESTAV, MX.*
“Cosmological models with dynamical systems”. Prof. T. Matos.
- Jun-Sept.06' **Short-term research visitor**, *Friedrich-Schiller-Universitat, Jena, DE.*
“Numerical methods in Cosmology”. Prof. B. Bruggmann.

Affiliations

- 2015 – Member of the APS, AAS.
- 2014 – Member of the Advisory Committee for CONACYT projects (RCEA), by invitation.
- 2013 – Member of the SDSS-III/SDSS-IV collaboration, as part of the BOSS/eBOSS experiment.
- 2013 – National System of Researchers, Level 1 (SNI 1).
- 2012 – Committee member of the Mexican Cambridge Society.
- 2006 – Member of Institute advanced of cosmology, <http://www.iac.edu.mx/>

Publications

* For further details and citations: [Google Scholar](#), [Inspirehep](#).

- [1] Michael Blomqvist *et al.* *Broadband distortion modeling in Lyman- α forest BAO fitting*. Submitted to JCAP. [arXiv:1504.06656](#)
- [2] Rupert A.C. Croft *et al.* *Large-scale clustering of Lyman-alpha emission intensity from SDSS/BOSS*. Submitted to MNRAS. [arXiv:1504.04088](#)
- [3] Ozgur Akarsu, Tekin Dereli, JAV. *A divergence-free parametrization for dynamical dark energy*. JCAP, 1506 (2015) 06, 049. [arXiv:1501.07598](#)
- [4] Shadab Alam *et al.* *The Eleventh and Twelfth Data Releases of the Sloan Digital Sky Survey: Final Data from SDSS-III*. ApJs 219 (2015) 1, 12. [arXiv:1501.00963](#)
- [5] JAV, Mariana Carrillo, Gabriel German, Alfredo Herrera, J.C. Hidalgo. *Constraining Hybrid Natural Inflation with recent CMB data*. JCAP 1502 (2015) 02, 039. [arXiv:1411.6616](#)
- [6] Éric Aubourg *et al.* *Cosmological Implications of baryon acoustic oscillation (BAO) measurements*. Accepted to PRD. [arXiv:1411.1074](#)
- [7] JAV *et al.* *Reciprocity invariance of the Friedmann equation, missing matter and double dark energy*. Submitted to PRD. [arXiv:1208.2542](#)
- [8] JAV, M. Bridges, Yin-Zhe Ma, M.P. Hobson. *Constraints on the Tensor-to-Scalar ratio for non-power law models*. JCAP 08(001) 2013, [arXiv:1303.4014](#)
- [9] JAV, M.P. Hobson, M. Bridges, A.N. Lasenby. *Reconstruction of the Dark Energy equation of state*. JCAP, 09(020), 2012. [arXiv:1205.0847](#)
- [10] JAV, M.P. Hobson, M. Bridges, A.N. Lasenby. *Model selection applied to reconstruction of the Primordial Power Spectrum*. JCAP 006(106), 2012. [arXiv:1203.1252](#)
- [11] JAV, A.N. Lasenby, M.P. Hobson, M. Bridges. *A Bayesian study of the primordial power spectrum from a novel closed universe*. MNRAS 422, 1948-1956, 2011. [arXiv:1103.4619](#)
- [12] Tonatiuh Matos, José-Rubén Luévano, Israel Quiros, L. Arturo Urena-López, JAV. *Dynamics of scalar field dark matter with a cosh potential*. PRD 80, 123521, 2009. [arXiv:0906.0396](#)
- [13] Tamé González, Tonatiuh Matos, Israel Quiros, JAV. *Self-interacting Scalar Field Trapped in a Randall-Sundrum Braneworld*. PLB 676, 161-167, 2009. [arXiv:0812.1734](#)
- [14] Tonatiuh Matos, JAV, Juan Magana. ϕ^2 as Dark Matter. MNRAS 393, 1359-1369, 2008. [arXiv:0806.0683](#)
- [15] Tonatiuh Matos, José-Rubén Luevano, Hugo Gracia Compeán, JAV. *An alternative Interpretation for the Moduli Fields of the Cosmology Associated to Type IIB Supergravity with Fluxes*. IJMPA 23, 1949-1962, 2008. [arXiv:0511098](#)

In Preparation

- [1p] BOSS Collaboration. *The clustering of galaxies in the SDSS-III Baryon Oscillation Spectroscopic Survey: Baryon Acoustic Oscillations in the Data Release 12 Galaxy Sample*.
- [2p] JAV, Anže Slosar, Hee-Jong Seo, David Weinberg. *Early Dark Energy: Reality and Fiction*.
- [3p] JAV, Anže Slosar, Andreu Font-Ribera, Patrick McDonald. *Gaussian Embedding – massively parallelizable sampling algorithm*.
- [4p] Sukhdeep Singh, Rachel Mandelbaum, Anže Slosar, JAV. *Cosmological constraints from galaxy-galaxy lensing and galaxy clustering*.
- [5p] Ozgur Akarsu, Tekin Dereli, Suresh Kumar, JAV. *Cosine-law for deceleration parameter*.
- [6p] Gabriel German, Graham Ross, JAV. *Observable bounds in Hybrid Natural Inflation from sub-Planckian field excursion*.
- [7p] JAV, M.P. Hobson, A.N. Lasenby, M. Bridges. *Cosmological constraints on Modified Gravity*.
- [8p] S. Hee, JAV, W. Handley, A.N. Lasenby, M.P. Hobson. *Analysis of Data Variations from a Constant Dark Energy Equation of State*.

Reviews

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

- [2R] JAV, Tonatiuh Matos. *Constraining Cosmological Inflation*. Accepted for publication by Rev. Mex. Fis. E.

Conference Proceedings

- [1C] Tonatiuh Matos, JAV, Juan Magana. *Study of Several Potentials as Scalar Field Dark Matter Candidates*. AIP Conf. Proc. 1083, 144-170, 2008. [AIP, 808386](#)
- [2C] Tonatiuh Matos, José Rubén Luevano, L. Arturo Urena, JAV. *Alternative interpretation for the moduli fields of string theories*. J. Phys. Conf. Ser. 91, 012014, 2007. [JP, 773227](#)

Scholarships & Awards

- 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.

Invited Talks

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|---------|--|------------------------------|
| 04.2015 | Cosmological implications of BAO measurements: BOSS DR11. | APS Meeting, MD, USA |
| 03.2015 | Gaussian Embedding algorithm and the BAO. | CMU, PA, USA |
| 03.2015 | Cosmology with BAO measurements. | Aspen, CO, USA |
| 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, USA |
| 12.2014 | Cosmological Implications of BAO measurements. | BOSS Meeting, NM, USA |
| 10.2014 | BAO implications on Dark Energy constraints. | BNL, NY, USA |
| 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 |

Selected Talks-(past five years)

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| 06.2014 | BAO in the Ly- α forest of BOSS DR11 quasars. | BNL, NY, USA |
| 09.2013 | Dark Energy: Cosmological constant and other alternatives. | CINVESTAV, MX |
| 09.2013 | Model Selection applied to Dark Energy models. | UNAM, MX |
| 09.2013 | La energía oscura del universo: 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 |

Travel grants (International)

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| 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, USA |
| 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, USA
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 desempeño.	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, Frontiers in Contemporary 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-Matemática.	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

Administration and Organization

09.2013	Workshop Organiser: Statistical and Numerical methods in Cosmology, IF, UNAM
01.2011	Mini-workshop Organiser: overview to CAMB and CosmoMC, ININ
2010-2012	Committee Member, “Cambridge University Mexican Society”, Cambridge.
2007-2008	Seminar group Organiser, “Geometry and Gravitation”, CINVESTAV.
2005-2007	Seminar group Organiser, “Cosmology, Astrophysics and Numerical relativity”, CINVESTAV.
2004-2005	Committee Member, “Consejo Técnico”, UAEM.
2004-2005	Committee Member, “Consejo Estudiantil de la Sociedad de Alumnos”, UAEM.
2001-2002	Committee Member, “Consejo Estudiantil de la Sociedad de Alumnos”, UAEM.

Teaching and Outreach

10.2015	Mentoring a high school student, BNL.
07.2009	Tutor of three summer students, CINVESTAV.
2006	Graduate Research Assistant, <i>Photo Acoustic Spectroscopy</i> , CINVESTAV.
2004-2005	Undergraduate Research Assistantship, <i>Galaxy Formation with dark matter</i> , UAEM.
2004	Undergraduate Teaching Assistant, <i>Mechanics Subject</i> , UAEM.
2003-2004	Undergraduate Research Assistantship, <i>Opto-galvanic spectroscopy of plasmas to low temperature</i> , UAEM.

Skills and Interests

Programming Fortran 90, C/C++, Python, basic HTML.
Maths Maple, Mathematica, Matlab.
Op. Systems Unix, Linux, Windows, Mac OS X.
Cosmology CAMB, CosmoMC, MultiNest, SimpleMC.
Useful Git, SVN, Latex, Emacs.
Codes [SimpleMC](#) (MCMC for BAO analysis in BOSS), [GE algorithm](#) (Sampling Algorithm)
[Cosmology](#) (BOSS Lyman- α analysis), [NP-CAMB](#) (Bayesian Reconstruction).

Others

Languages Native Spanish; fluent English; elementary German.
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.
Extra Online Stocks/ETFs trader.

References

Anže Slosar, *Physics Department*, Brookhaven National Lab, Upton, 11973, NY, USA.
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Anthony Lasenby, *Kavli Institute for Cosmology*, University of Cambridge, CB3 0HA, UK.
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