

Lorenzo Sorbo

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Appointments

- 09/'11- : Associate Professor,
University of Massachusetts, Amherst, Physics Department
- 09/'05-08/'11: Assistant Professor,
University of Massachusetts, Amherst, Physics Department
- 10/'03-08/'05: Postdoctoral Researcher,
University of California, Davis, Physics Department
- 10/'02-10/'03: Postdoctoral Researcher,
Laboratoire d'Annecy-Le-Vieux de Physique Théorique
- 11/'01-10/'02: Postdoctoral Researcher,
Institut d'Astrophysique de Paris

Education

- 11/'97-10/'01: Ph.D. in Physics
International School of Advanced Studies (SISSA/ISAS), Trieste
- 10/'92-06/'97: "*Laurea*" (B.Sc.) in Physics, *cum laude*
University of Bologna

Teaching

F '12: PHY614, Graduate *Quantum mechanics I*
S '12: PHY422, Undergraduate *Electricity and Magnetism*
F '09, F '10, F '11: PHY421, Undergraduate *Mechanics*
S '08, S '10, S '11: PHY120, *Big Bang to Black Holes*, Undergraduate General Education course
F '06, F '07, F '08: PHY568/821, Undergraduate and Graduate *General Relativity and Cosmology*
S '06, S '07: PHY602, Graduate *Statistical Physics*
F '05, F '14: PHY852, Graduate *Cosmology*

Service

S '14: Co-organizer of the workshop "Lambda and Quasi-Lambda"
'11-'12, '14-'15: High Energy Theory Faculty Search Committee
'11-'12: Chair, Graduate Qualifying Exam Committee
F '11, '12: Co-organizer of Research Symposium for Graduate Students
F '10: Local Organizing Committee for the "Amherst Phenomenology Workshop".
'09-'10: Biophysics Faculty Search Committee
'09-'10: M. Sc. Exam Committee
S '07, '08, '10: Graduate Admissions Committee
'06-'07, '11-'12: Personnel Subcommittee
F '06: Organized one parallel session, "Cosmo 2006".
'05-'06: High Energy Experiment Faculty Search Committee
'05-'08, '10, F '12, '14-'15: Graduate Qualifying Exam Committee
'04-'08, '10-'11: Seminar Co-organizer
Regular referee for Phys. Rev. Lett., Phys. Rev. **D**, JCAP, Class. Quant. Grav, the European Physical Journal C. Also refereed papers for Phys. Lett. **B**, JHEP, Astroparticle Physics, J. Phys. **A**, Advances in Astronomy and Progress of Theoretical Physics. Refereed ~ 150 articles to date.
Regular proposal reviewer for the National Science Foundation.

Short term appointments

02-03/'05: CERN, Theory Division

06/'10: "Professeur Invité", University of Paris-Sud, Orsay

06/'11, 06/'13: "Professeur Invité", AstroParticules et Cosmologie, University of Paris 7

09/'13-12/'13: "Chercheur Invité", Institut de Physique Théorique, CEA, Saclay

Students and Postdocs Advised

'05-'10: Mohamed Anber, graduate student, chair of thesis committee

'10-'13: Jessica Cook, graduate student, chair of thesis committee

'06-'07: Koushik Dutta, graduate student

'10-'12: Ufuk Aydemir, graduate student

'13-current: Basem Elmenoufi, graduate student

'08-'11: Luca Grisa, postdoc

'11-'13: Minjoon Park, postdoc

Publications

1. C. Caprini and L. Sorbo,
Adding helicity to inflationary magnetogenesis
JCAP **1410** (2014) 10, 056
arXiv:1407.2809 [astro-ph.CO].
2. C. R. Contaldi, M. Peloso and L. Sorbo,
Suppressing the impact of a high tensor-to-scalar ratio on the temperature anisotropies
JCAP **1407**, 014 (2014)
arXiv:1403.4596 [astro-ph.CO].
3. M. Peloso, L. Sorbo and G. Tasinato,
A falsely fat curvaton with an observable running of the spectral tilt
JCAP **1406** 040 (2014)
arXiv:1401.7136 [astro-ph.CO].
4. J. L. Cook and L. Sorbo,
An inflationary model with large tensor and small scalar nongaussianities
JCAP **1311**, 047 (2013)
arXiv:1307.7077 [astro-ph.CO].
5. M. Park and L. Sorbo,
Vacua and instantons of ghost-free massive gravity
Phys. Rev. D **87**, 024041 (2013)
arXiv:1212.2691 [hep-th].
6. M. Park and L. Sorbo,
Massive Gravity from Higher Derivative Gravity with Boundary Conditions
JHEP **1301**, 043 (2013)
arXiv:1210.7733 [hep-th].
7. M. M. Anber and L. Sorbo,
Non-Gaussianities and chiral gravitational waves in natural steep inflation
Phys. Rev. D **85**, 123537 (2012)
arXiv:1203.5849 [astro-ph.CO].
8. M. Park and L. Sorbo,
Sudden variations in the speed of sound during inflation: features in the power spectrum and bispectrum
Phys. Rev. D **85**, 083520 (2012)
arXiv:1201.2903 [astro-ph.CO].

9. J. L. Cook and L. Sorbo,
Particle production during inflation and gravitational waves detectable by ground-based interferometers
Phys. Rev. D **85**, 023534 (2012)
arXiv:1109.0022 [astro-ph.CO].

10. D. Kastor, L. Sorbo and J. Traschen,
Dynamics of localized Kaluza-Klein black holes in a collapsing Universe
Class. Quant. Grav. 29 (2012) 055011
arXiv:1108.4813 [hep-th].

11. L. Sorbo,
Parity Violation in the Cosmic Microwave Background from a Pseudoscalar Inflaton
JCAP **1106**, 003 (2011)
arXiv:1101.1525 [astro-ph.CO].

12. N. Kaloper, A. Lawrence and L. Sorbo,
An Ignoble Approach to Large Field Inflation
JCAP **1103**, 023 (2011)
arXiv:1101.0026 [hep-th].

13. U. Aydemir, L. Grisa and L. Sorbo,
Dynamical four-form fields
Phys. Rev. **D83**, 063516 (2011)
arXiv:1009.5690 [hep-th].

14. L. Grisa and L. Sorbo,
Tachyonic Quintessence and a Preferred Direction in the Sky
Phys. Rev. D **81**, 083532 (2010)
arXiv:1002.0510 [astro-ph.CO].

15. M. M. Anber and L. Sorbo,
Naturally inflating on steep potentials through electromagnetic dissipation
Phys. Rev. D **81**, 043534 (2010)
arXiv:0908.4089 [hep-th].

16. D. Langlois and L. Sorbo,
Primordial perturbations and non-Gaussianities from modulated trapping
JCAP **0908**, 014 (2009)
arXiv:0906.1813 [astro-ph.CO].

17. L. Grisa and L. Sorbo,
Pauli-Fierz Gravitons on Friedmann-Robertson-Walker Background
Phys. Lett. **B686** (2010), 273
arXiv:0905.3391 [hep-th].

18. N. Kaloper and L. Sorbo,
A Natural Framework for Chaotic Inflation
Phys. Rev. Lett. **102**, 121301 (2009)
arXiv:0811.1989 [hep-th].

19. N. Kaloper and L. Sorbo,
Where in the String Landscape is Quintessence
Phys. Rev. D **79**, 043528 (2009)
arXiv:0810.5346 [hep-th].

20. L. Sorbo,
Cosmology With Pseudo-Nambu-Goldstone Bosons
Mod. Phys. Lett. A **23**, 979 (2008).

21. N. Kaloper, L. Sorbo and J. Yokoyama,
Higgsflation at the GUT scale in a Higgsless Universe
Phys. Rev. D **78**, 043527 (2008)
arXiv:0803.3809 [hep-ph].

22. M. Anber and L. Sorbo,
New exact solutions on the Randall-Sundrum 2-brane: lumps of dark radiation and accelerated black holes
JHEP **0807**, 098 (2008)
arXiv:0803.2242 [hep-th].

23. M. Anber and L. Sorbo,
Two gravitational shock waves on the AdS₃ brane
JHEP **0710** (2007) 072,
arXiv:0706.1560 [hep-th].

24. K. Dutta and L. Sorbo,
Confronting pNGB quintessence with data
Phys. Rev. D **75** (2007) 063514,
astro-ph/0612457.

25. M. M. Anber and L. Sorbo,
N-flationary magnetic fields
JCAP **0610**, 018 (2006),
astro-ph/0606534.

26. M. Peloso, L. Sorbo and G. Tasinato,
Standard 4d gravity on a brane in six dimensional flux compactifications
Phys. Rev. D **73** (2006) 104025,
hep-th/0603026.

27. N. Kaloper and L. Sorbo,
Of pNGB QuiNtessence
JCAP **0604** (2006) 007,
astro-ph/0511543.

28. N. Kaloper and L. Sorbo,
Locally localized gravity: the inside story
JHEP **0508** (2005) 070,
hep-th/0507191.

29. N. Kaloper, J. Rahmfeld and L. Sorbo,
Moduli entrapment with primordial black holes
Phys. Lett. **B606** (2005) 234,
hep-th/0409226.

30. N. Kaloper, M. Kleban and L. Sorbo,
Observational implications of cosmological event horizons
Phys. Lett. **B600** (2004) 7,
astro-ph/0406099.

31. A. Albrecht and L. Sorbo,
Can the universe afford inflation?
Phys. Rev. D **70** (2004) 063528,
hep-th/0405270.

32. M. Peloso and L. Sorbo,
Moving sources in a ghost condensate
Phys. Lett. **B593** (2004) 25,
hep-th/0404005.

33. J. Lesgourgues and L. Sorbo,
Goldberger-Wise variations: stabilizing brane models with a bulk scalar
Phys. Rev. D **69** (2004) 084010,
hep-th/0310007.

34. D. Langlois and L. Sorbo,
Bulk gravitons from a cosmological brane
Phys. Rev. **D68**, (2003) 084006,
hep-th/0306281.

35. L. Boubekur, S. Davidson, M. Peloso and L. Sorbo,
Leptogenesis and rescattering in supersymmetric models
Phys. Rev. **D67** (2003) 043515,
hep-ph/0209256.

36. D. Langlois, L. Sorbo and M. Rodríguez-Martínez,
Cosmology of a brane radiating gravitons into the extra dimension
Phys. Rev. Lett. **89** (2002) 171301,
hep-th/0206146.
37. M. Peloso and L. Sorbo,
Moduli from cosmic strings
Nucl. Phys. **B649** (2002) 88,
hep-ph/0205063.
38. D. Langlois and L. Sorbo,
Effective action for the homogeneous radion in brane cosmology
Phys. Lett. **B543** (2002) 155,
hep-th/0203036.
39. B. A. Bassett, M. Peloso, L. Sorbo and S. Tsujikawa,
Fermion production from preheating-amplified metric perturbations
Nucl. Phys. **B622** (2002) 393,
hep-ph/0109176.
40. H. P. Nilles, M. Peloso and L. Sorbo,
Coupled fields in external background with application to nonthermal production of gravitinos
JHEP **0104** (2001) 004,
hep-th/0103202.
41. H. P. Nilles, M. Peloso and L. Sorbo,
Nonthermal production of gravitinos and inflatinos
Phys. Rev. Lett. **87** (2001) 051302,
hep-ph/0102264.
42. J. Lesgourgues, S. Pastor, M. Peloso and L. Sorbo,
Cosmology of the Randall-Sundrum model after dilaton stabilization
Phys. Lett. **B489** (2000) 411,
hep-ph/0004086.
43. A. Masiero, M. Peloso, L. Sorbo and R. Tabbash,
Baryogenesis vs. proton stability in theories with extra dimensions
Phys. Rev. **D62** (2000) 063515,
hep-ph/0003312.
44. M. Peloso and L. Sorbo,
Preheating of massive fermions after inflation: analytical results
JHEP **0005** (2000) 016,
hep-ph/0003045.

45. A. A. Andrianov, R. Soldati and L. Sorbo,
Dynamical Lorentz symmetry breaking from 3+1 axion-Wess-Zumino model
Phys. Rev. **D59** (1999) 025002,
hep-th/9806220.

46. R. Soldati and L. Sorbo,
Effective action for Dirac spinors in the presence of general uniform electromagnetic fields
Phys. Lett. **B426** (1998) 82,
hep-th/9802167.

Talks and Seminars

Adding helicity to magnetogenesis

05/'14 CP3-Origins, Odense

Suppressing the impact of a high tensor-to-scalar ratio on the temperature anisotropies

06/'14 *Invited plenary talk*, "GDR TeraScale", Ecole Polytechnique, Palaiseau

04/'14 TUM, Munich

04/'14 APC, Paris

03/'14 IFAE, Barcelona

Large tensor and small scalar nongaussianities

02/'14 *Invited plenary talk*, "Mini-Workshop on Gravitation and Cosmology", Kyoto

01/'14 CERN, Geneva

12/'13 Laboratoire d'Annecy-le-Vieux de Physique Théorique

12/'13 IFIC, Valencia

11/'13 CEA, Saclay

09/'13 *Invited plenary talk*, "Cosmology After Planck", University of Michigan, Ann Arbor

Sudden variations in the speed of sound during inflation

12/'12 FTPI, Minneapolis

Nonstandard tensor modes from inflaton

03/'13 Institut d'Astrophysique de Paris

12/'12 Case Western Reserve University, Cleveland

04/'12 New York University

02/'12 *Colloquium*, University of California, Davis

11/'11 Dartmouth College

10/'11 Perimeter Institute

10/'11 *Invited plenary talk*, "Pre-Planckian Inflation meeting", Minneapolis

09/'11 *Invited plenary talk*, "Northeast Cosmology Workshop", Montreal

Parity Violation in the CMB from a Pseudoscalar Inflaton

07/'11 University of Paris-Sud, Orsay

06/'11 APC, Paris

04/'11 *Invited plenary talk*, "PONT D'Avignon", Avignon

02/'11 University of Padova

Naturally inflating on steep potentials

02/'14 IPMU, Tokyo
 03/'13 APC, Paris
 05/'09 University of California, Davis

A natural framework for chaotic inflation

03/'13 Institut Henri Poincaré, Paris
 06/'10 University of Paris-Sud, Orsay
 06/'10 University of Tours
 05/'10 "From the Planck Scale to the Electroweak Scale", CERN
 04/'10 FTPI, Minneapolis
 11/'09 Tufts University
 04/'09 University of Massachusetts, Amherst
 03/'09 CERN
 03/'09 University of Padova
 03/'09 University of Bologna
 02/'09 APC, Paris

New exact solutions on the Randall-Sundrum 2-brane

10/'08 Syracuse University
 05/'08 *Invited plenary talk*, "Quantum Black Holes, Braneworlds and Holography", Valencia

Two gravitational shock waves on the AdS₃ brane

11/'07 New York University
 10/'07 Yale University

Confronting pNGB quintessence with data

10/'10 *Colloquium*, University of Massachusetts, Amherst
 01/'09 *Colloquium*, University of Connecticut
 06/'08 "The Dark Side: 2", Ann Arbor
 11/'07 Tufts University
 07/'07 *Invited plenary talk*, "Workshop on Strings and Cosmology", Trieste
 06/'07 *Invited plenary talk*, "The Dark Side of the Universe", Minneapolis

N-flationary magnetic fields

05/'07 University of Bologna
 01/'07 University of California, Davis
 11/'06 CEA, Saclay
 08/'06 *Invited plenary talk*, "Workshop on Modern Cosmology", Benasque
 06/'06 "IAP Colloquium: Inflation+25", Paris
 06/'06 *Invited talk*, "Susy06", Irvine

Standard 4d gravity on a brane in six dimensional flux compactifications

04/'07 University of Massachusetts, Amherst
 03/'07 Perimeter Institute
 02/'07 *Colloquium*, University of Massachusetts, Amherst
 10/'06 Harvard University

Locally localized gravity: The inside story

05/'06 "From the Planck Scale to the Electroweak Scale", Paris

Of pNGB quiNtessence

03/'07 *Colloquium*, Amherst College
 10/'06 *Colloquium*, University of Massachusetts, Amherst, Dept. of Astronomy
 11/'05 University of California, Davis

Moduli entrapment with primordial black holes

11/'05 CEA, Saclay
 04/'05 Harvard University
 03/'05 Laboratoire de Physique Théorique et Hautes Energies, Paris
 03/'05 Laboratoire de Physique Théorique et Astroparticules, Montpellier
 02/'05 University of Massachusetts, Amherst
 12/'04 University of Padua
 12/'04 University of California, Davis
 10/'04 University of Minnesota, Minneapolis

Moving sources in a ghost condensate

05/'04 Laboratoire d'Annecy-le-Vieux de Physique Théorique
 05/'04 UCLA
 04/'04 Institut d'Astrophysique de Paris
 03/'04 University of California, Davis

Goldberger-Wise variations: stabilizing brane models with a bulk scalar

11/'03 CITA, Toronto

Preheating from mixing

05/'03 "From the Planck Scale to the Electroweak Scale", Madrid
 02/'03 University of Warsaw

Leptogenesis and rescattering in supersymmetric models

11/'02 University of Bologna
 10/'02 "5ème Journée des Lacs Alpains de Cosmologie", Annecy

Cosmology of a brane radiating gravitons into the extra dimension

10/'02 "Colloque du PNC", Paris
 09/'02 "String/Brane Cosmology", Paris
 07/'02 "1st International Conference on String Phenomenology", Oxford

Non-thermal Production of Gravitinos and Inflatinos

09/'02 *Invited plenary talk*, EU "Supersymmetry and the Early Universe" meeting, Oxford
 05/'01 "From the Planck Scale to the Electroweak Scale", La Londe les Maures
 03/'01 Institut d'Astrophysique de Paris
 01/'01 University of Bonn

Moduli from cosmic strings

06/'02 Laboratoire d'Annecy le Vieux de Physique Théorique
 05/'02 Laboratoire de Physique Théorique, Orsay

Cosmology of the Randall-Sundrum model after dilaton stabilization

11/'01 "3ème Journée des Lacs Alpains de Cosmologie", CERN, Geneva
 05/'01 University of Bologna
 02/'01 *Invited plenary talk*, "Problemi Attuali di Fisica Teorica", Vietri sul Mare
 12/'00 "AEFNet Inaugural meeting", Oxford
 06/'00 "Motivations for and Implications of Extra Cosmological Dimensions?", Meudon

Preheating of massive fermions after inflation: analytical results

01/'01 "Cairo International Conference on High Energy Physics"
 10/'00 "Frontiers in Particle Astrophysics and Cosmology", San Feliu de Guixols
 04/'00 "From the Planck Scale to the Electroweak Scale", Castelvecchio Pascoli

Baryogenesis vs. proton stability in theories with extra dimensions

03/'00 Rencontres de Moriond session "Electroweak Interactions", Les Arcs