

## Curriculum Vitae et Studiorum

- ◇ **Name:** Alessandra Buonanno
- ◇ **Citizenship:** Italian
- ◇ **Current address:** Department of Physics, University of Maryland, College Park, MD 20742;  
Tel.: 301 405 1440; Fax: 301 314 9525
- ◇ **Current faculty position:** Associate Professor of Physics
- ◇ **E-mail address:** buonanno@physics.umd.edu
- ◇ **Languages spoken:** Italian (mother tongue), English and French

### University education, jobs, awards and prizes

- **Education:**

- ★ 1996, Ph.D. in Physics, University of Pise, Italy  
Title of Ph.D. thesis: *Quantum vacuum fluctuations in gravity and string cosmology*.  
Supervisor: Prof. M. Maggiore (University of Genève, Switzerland)
- ★ 1993, Master in Physics (*Laurea*), University of Pise, Italy  
with first class honors (score 110/110 with laude)  
Title of Master thesis based on theoretical physics studies: *Energy momentum tensor for lattice scalar field theories improved with Symanzik technique*.  
Supervisor: Prof. G. Curci (University of Pise, Italy)

- **Fellowships, jobs, visiting positions:**

- ★ Jan-Aug 1997: Research grant received from University of Pise (Italy) to be spent at the Theoretical Division of CERN (Genève, Switzerland)
- ★ Sep 1997-Sep 1999: Postdoctoral Fellow at Institut des Hautes Etudes Scientifiques (IHES), Bures-sur-Yvette (Paris), France.
- ★ Oct 1999-Nov 2002: Richard C. Tolman Prize Postdoctoral Fellow at Caltech, Pasadena, CA.
- ★ Dec 2001 - Dec 2004: “Chargée de Recherche de 1ere classe” (CR1) of CNRS at the *Institut d’Astrophysique de Paris* (IAP), Paris, France.
- ★ Jan 2005 - Aug 2005: “Chargée de Recherche de 1ere classe” (CR1) of CNRS at the *Laboratoire d’Astroparticule et Cosmologie* (APC), Paris, France.
- ★ since Aug 2005: On leave of absence from the *Laboratoire d’Astroparticule et Cosmologie* (APC), Paris, France.
- ★ since Aug 2005: Associate Professor of Physics (with tenure), Department of Physics, University of Maryland.
- ★ Jan-Oct 2002: Visiting associate at Caltech, Pasadena, CA.
- ★ July-Aug 2003: Visiting associate at Caltech, Pasadena, CA.
- ★ Jan 2005- Jan 2008: Visiting associate at Caltech, Pasadena, CA.

- **Prizes, Awards and Grants:**

- ★ 2000 Italian Society of General Relativity and Gravitational Physics (SIGRAV) Prize 2000 for *Studies in General Relativity with applications in Astrophysics and Cosmology*

- ★ 2006-2008 Alfred P. Sloan Fellow
- ★ 2006-2009 NSF grant, single P.I.
- **Collaborations with experimental groups:**
  - ★ 2000 -2005 participant in the “Memorandum of Understanding” between Caltech Relativity Theory (Prof. K.S. Thorne being the P.I.) and the LIGO Scientific Collaboration.
  - ★ Since September 2003 member of “Inspiral upper limit group”, LIGO Scientific Collaboration.
  - ★ Since 2005 P.I. of the “Memorandum of Understanding” between Maryland Gravitational-Wave Theory Group and the LIGO Scientific Collaboration.
- **Graduate student co-advisees:** Yanbei Chen (PhD 2003, Caltech), Michele Vallisneri (PhD 2002, Caltech) and Yi Pan (PhD 2006, Caltech) (Prof. K.S. Thorne being the advisor)
- **Graduate student advisee:** Evan Ochsner (Maryland)
- **Postdoctoral advisee:** Jeremy Schnittman (PhD 2005, MIT) and Yi Pan (PhD 2006, Caltech)

## Publications

- [1] J. Schnittman, A. Buonanno, J. R. van Meter, J.G. Baker, W.D. Boggs, J. Centrella, B.J. Kelly, and S.T. McWilliams, **Anatomy of the binary black hole recoil: A multipolar analysis**, submitted to Phys. Rev. D, arXiv:0707.0301 [astro-ph].
- [2] A. Buonanno, Y. Pan, J.G. Baker, J. Centrella, B.J. Kelly, S.T. McWilliams, and J.R. van Meter, **Toward faithful templates for non-spinning binary black holes using the effective-one-body approach**, submitted to Phys. Rev. D, arXiv:0706.3732 [gr-qc].
- [3] Y. Pan, A. Buonanno, J. Baker, J. Centrella, B. Kelly, S. McWilliams, F. Pretorius, and J. van Meter, **Data-analysis driven comparison between analytic and numerical waveforms: nonspinning case**, submitted to Phys. Rev. D arXiv:0704.1964 [gr-qc].
- [4] J. Schnittman and A. Buonanno, **The Distribution of recoil velocities from merging black holes**, *Astrophys. J.* **662**, L63 (2007) [astro-ph/0702641].
- [5] A. Buonanno, G. Cook and F. Pretorius, **Inspiral, merger and ring-down of equal-mass black-hole binaries**, *Phys. Rev. D* **75**, 124018 (2007) [gr-qc/0610122].
- [6] G. Sigl, J. Schnittman and A. Buonanno, **Gravitational-wave background from compact objects embedded in AGN accretion disks**, *Phys. Rev. D* **75** (2007) 024034 [gr-qc/0610180].
- [7] L. Blanchet, A. Buonanno and G. Faye, **Higher-order spin effects in the dynamics of compact binaries. II. Radiation field**, *Phys. Rev. D* **74** (2006) 104034 [gr-qc/0605140].
- [8] G. Faye, L. Blanchet, A. Buonanno, **Higher-order spin effects in the dynamics of compact binaries. I. Equations of motion**, *Phys. Rev. D* **74** (2006) 104033 [gr-qc/0605139].
- [9] A. Buonanno, Y. Chen and T. Damour, **Transition from adiabatic inspiral to plunge in precessing compact binaries**, *Phys. Rev. D* **74** (2006) 104005 [gr-qc/0508067].
- [10] V. Mandic and A. Buonanno, **Accessibility of the Pre-Big Bang Models to LIGO**, *Phys. Rev. D* **73** (2006) 063008 [astro-ph/0510341].

- [11] A. Buonanno, Y. Chen, Y. Pan, H. Tagoshi and M. Vallisneri, **Detecting gravitational waves from precessing binaries of spinning compact objects. II. Search implementation for low-mass binaries**, Phys. Rev. D **72** (2005) 084027 [gr-qc/0508064].
- [12] A. Buonanno, G. Sigl, G. Raffelt, T. Janka and E. Mueller, **Stochastic Gravitational Wave Background from Cosmological Supernovae**, Phys. Rev. D **72** (2005) 084001 [astro-ph/0412277].
- [13] E. Berti, A. Buonanno and C.S. Will, **Estimating spinning binary parameters and testing alternative theories of gravity with LISA**, Phys. Rev. D **71** (2005) 084025 [gr-qc/0411129].
- [14] M. Hartl and A. Buonanno, **The dynamics of precessing binary black holes using the post-Newtonian approximation**, Phys. Rev. D **71** (2005) 024027 [gr-qc/0407091].
- [15] A. Buonanno, Y. Chen, Y. Pan and M. Vallisneri, **A quasi-physical family of gravity-wave templates for precessing binaries of spinning compact objects: II. Application to double-spin precessing binaries**, Phys. Rev. D **70** (2004) 104003 [gr-qc/0405090].
- [16] Y. Pan, A. Buonanno, Y. Chen and M. Vallisneri, **A physical family of gravity-wave templates for precessing binaries of spinning compact objects: I. Application to single-spin precessing binaries**, Phys. Rev. D **69** (2004) 104017 [gr-qc/0310034].
- [17] A. Buonanno and Y. Chen, **Improving the sensitivity to gravitational-wave sources by modifying the input-output optics of advanced interferometers**, Phys. Rev. D **69** (2004) 102004 [gr-qc/0310026].
- [18] A. Buonanno, Y. Chen and N. Mavalvala, **Quantum noise in laser-interferometer gravitational-wave detectors with heterodyne readout scheme**, Phys. Rev. **D67** (2003) 122005 [gr-qc/0302041].
- [19] A. Buonanno, Y. Chen and M. Vallisneri, **Detecting gravitational waves from precessing binaries of spinning compact objects: Adiabatic limit**, Phys. Rev. **D67** (2003) 104025 [gr-qc/0211087].
- [20] A. Buonanno and Y. Chen, **Scaling law in signal-recycled laser interferometer gravitational-wave detectors**, Phys. Rev. **D67** (2003) 062002 [gr-qc/0208048].
- [21] A. Buonanno, Y. Chen and M. Vallisneri, **Detecting gravitational waves from the final stages binary–black-hole inspirals: Nonspinning case**, Phys. Rev. **D67** (2003) 024016 [gr-qc/0205122].
- [22] A. Buonanno and Y. Chen, **Signal recycled laser-interferometer gravitational-wave detectors as optical springs**, Phys. Rev. **D65** (2002) 042001 [gr-qc/0107021].
- [23] A. Buonanno and Y. Chen, **Quantum noises in second generation laser interferometric gravitational-wave detectors**, Phys. Rev. **D64** (2001) 042006 [gr-qc/0102012].
- [24] A. Buonanno and T. Damour, **Fate of classical inhomogeneities in pre-big-bang string cosmology**, Phys. Rev. **D64** (2001) 043501 [gr-qc/0102102].
- [25] A. Buonanno and Y. Chen, **Optical noise correlations and beating the standard quantum limit in LIGO-II**, Class. Quantum Grav. **18** (2001) L95-L101 [gr-qc/0010011].
- [26] A. Buonanno, M. Lemoine and K.A. Olive, **Reheating and dangerous relics in pre-big-bang string cosmology**, Phys. Rev. **D62** (2000) 083513 [hep-th/0006054].
- [27] A. Buonanno, **Reduction of the two-body dynamics into a one-body description in classical electrodynamics**, Phys. Rev. **D62** (2000) 104022 [hep-th/0004042].

- [28] A. Buonanno and T. Damour, **Transition from adiabatic inspiral to plunge in binary black hole coalescences**, Phys. Rev. **D62** (2000) 064015 [gr-qc/0001013].
- [29] A. Buonanno and T. Damour, **Effective one-body approach to general relativistic two-body dynamics**, Phys. Rev. **D59** (1999) 084006 [gr-qc/9811091].
- [30] A. Buonanno, T. Damour e G. Veneziano, **Pre-big bang bubbles from the gravitational instability of generic string vacua**, Nucl. Phys. **B543** 275 (1999) [hep-th/9806230].
- [31] A. Buonanno and T. Damour, **Effective action and tension renormalization for cosmic and fundamental strings**, Phys. Lett. **B432** (1998) 51 [hep-th/9803025].
- [32] A. Buonanno and T. Damour, **Gravitational, dilatonic and axionic radiative damping of cosmic strings**, Phys. Rev. **D60** 023517 (1999) [gr-qc/9801105].
- [33] A. Buonanno, K.A. Meissner, C. Ungarelli and G. Veneziano, **Quantum inhomogeneities in string cosmology**, Journal of High Energy Physics **01** (1998) 004 [hep-th/9710188].
- [34] A. Buonanno, K.A. Meissner, C. Ungarelli and G. Veneziano, **Classical inhomogeneities in string cosmology**, Phys. Rev. **D57** (1998) 2543 [hep-th/9706221].
- [35] A. Buonanno, M. Gasperini and C. Ungarelli, **A class of non-singular gravi-dilaton background**, *Essay written for the 1997 Awards of the Gravity Research Foundation and selected for Honorable Mention*, Mod. Phys. Lett. **A25** (1997) 1883 [hep-th/9707053].
- [36] A. Buonanno, M. Gasperini, M. Maggiore and C. Ungarelli, **Expanding and contracting universes in third quantized string cosmology**, Class. Quant. Grav. **14** (1997) L97-L103 [hep-th/9701146].
- [37] A. Buonanno, M. Maggiore and C. Ungarelli, **Spectrum of relic gravitational waves**, Phys. Rev. **D55** (1997) 3330 [gr-qc/9605072].
- [38] A. Buonanno, S. Foffa, M. Maggiore and C. Ungarelli, **Symmetry breaking aspects of the effective Lagrangian for quantum black holes**, Phys. Lett. **B382** (1996) 227 [gr-qc/9603010].
- [39] A. Buonanno, M. Gattobigio, M. Maggiore, L. Pilo and C. Ungarelli, **Effective lagrangian for quantum black holes**, Nucl. Phys. **B451** (1995) 677 [gr-qc/9504020].
- [40] B. Alles, A. Buonanno and G. Cella, **Perturbation theory predictions and Monte Carlo simulations for the 2-d  $O(n)$  non-linear  $\sigma$ -models**, Nucl. Phys. **B500** (1997) 513 [hep-lat/9701001].
- [41] A. Buonanno and G. Cella, **Swendsen-Wang update algorithm for the Symanzik improved  $\sigma$  model**, Phys. Rev. **D51** (1995) 5865 [hep-lat/9506007].
- [42] A. Buonanno, G. Cella and G. Curci, **Lattice energy-momentum tensor with Symanzik improved actions**, Phys. Rev. **D51** (1995) 4494 [hep-lat/9506008].

## Publications of LIGO Scientific Collaboration on which Buonanno is listed as a co-author

- [1] B. Abbott et al. (LIGO Scientific Collaboration), **Detector description and performance for the first coincidence observations between LIGO and GEO**, Nucl. Instrum. Meth. A **517** (2004) 154-179, [gr-qc/0308043].

- [2] B. Abbott et al. (LIGO Scientific Collaboration), **Setting upper limits on the strength of periodic gravitational waves using the first science data from the GEO600 and LIGO detectors**, Phys. Rev. D, **69** (2004) 082004, [gr-qc/0308050].
- [3] B. Abbott et al. (LIGO Scientific Collaboration), **First upper limits from LIGO on gravitational wave bursts**, Class. Quantum Grav. **21** (2004) S677-S684, [gr-qc/0312056].
- [4] B. Abbott et al. (LIGO Scientific Collaboration), **Analysis of LIGO data for gravitational waves from binary neutron stars**, Phys. Rev. D **69** (2004) 122001, [gr-qc/0308069].
- [5] B. Abbott et al. (LIGO Scientific Collaboration), **Upper limits on the strength of periodic gravitational waves from PSR J1939+2134**, Class. Quant. Grav. **21** (2004) S671-S676, [gr-qc/0311023].
- [6] B. Abbott et al. (LIGO Scientific Collaboration), **Analysis of first LIGO science data for stochastic gravitational waves**, Phys. Rev. D **69** (2004) 122004, [gr-qc/0312088].
- [7] B. Abbott et al. (LIGO Scientific Collaboration) **Limits on gravitational wave emission from selected pulsars using LIGO data**, Phys. Rev. Lett. **94** (2004) 181103 [gr-qc/0410007].
- [8] B. Abbott et al. (LIGO Scientific Collaboration) **A search for gravitational waves associated with the gamma ray burst GRB 030329 using LIGO detectors**, Phys. Rev. D **72** (2005) 042002 [gr-qc/0501068].
- [9] B. Abbott et al. (LIGO Scientific Collaboration) **Upper limits on gravitational wave bursts in LIGO's second science run**, Phys. Rev. D. **72** (2005) 062001 [gr-qc/0505029].
- [10] B. Abbott et al. (LIGO Scientific Collaboration) **Search for gravitational waves from galactic and extra-galactic binary neutron stars**, Phys. Rev.D **72** (2005) 082001 [gr-qc/0505041].
- [11] B. Abbott et al. (LIGO Scientific Collaboration) **Search for gravitational waves from primordial black hole binary coalescences in the galactic halo**, Phys. Rev. D **72** (2005) 082002 [gr-qc/0505042].
- [12] B. Abbott et al. (LIGO Scientific Collaboration) **Upper limits from the LIGO and TAMA detectors on the rate of gravitational-wave bursts**, Phys. Rev. D **72** (2005) 122004 [gr-qc/0507081].
- [13] B. Abbott et al. (LIGO Scientific Collaboration) **First all -sky upper limits from LIGO on the strength of periodic gravitational waves using the Hough transform**, Phys. Rev. D **72** (2005) 102004 [gr-qc/0508065].
- [14] B. Abbott et al. (LIGO Scientific Collaboration) **Upper Limits on a stochastic background of gravitational waves**, Phys. Rev. Lett. **95** (2005) 221101 [astro-ph/0507254].
- [15] B. Abbott et al. (LIGO Scientific Collaboration) **Search for gravitational waves from binary black hole inspirals in LIGO data**, Phys. Rev. D **73** (2006) 062001 [gr-qc/0509129].
- [16] B. Abbott et al. (LIGO Scientific Collaboration) **Search for gravitational-wave bursts in LIGO's third science run**, Classical and Quantum Gravity **23** (2006) S29 [gr-qc/0511146].
- [17] B. Abbott et al. (LIGO Scientific Collaboration) **Joint LIGO and TAMA300 search for gravitational waves from inspiralling neutron star binaries**, Phys. Rev. D **73** (2006) 102002 [gr-qc/0512078].
- [18] B. Abbott et al. (LIGO Scientific Collaboration) **Coherent searches for periodic gravitational waves from unknown isolated sources and Scorpius X-1**, [gr-qc/0605028].

- [19] B. Abbott et al. (LIGO Scientific Collaboration) **Searching for a stochastic background of gravitational waves with LIGO**, [astro-ph/0608606].

## Proceedings

- [1] A. Buonanno, **Gravitational waves**, Lectures given at the Fabric of Spacetime Summer School, Les Houches, France
- [2] A. Buonanno, **Analytic modeling of binary black-hole coalescence**, Proceedings of *Eleventh Marcel Grossmann Meeting*, 2006, Berlin, Germany.
- [3] J. Schnittman, G. Sigl and A. Buonanno, **Gravitational waves from compact objects accreting onto active galactic nuclei**, 6<sup>th</sup> International LISA Symposium, Goddard, June 2006 [astro-ph/0608596].
- [4] E. Berti, A. Buonanno and C. Will, **Testing general relativity and probing the merger history of massive black holes with LISA**, 9<sup>th</sup> Gravitational Wave Data Analysis Workshop, Annecy, France [gr-qc/0504017].
- [5] A. Buonanno, **Gravitational-Wave Sources: Source Science and Statistical Methods**, GR17 (2004), Dublin, Ireland.
- [6] A. Buonanno, **TASI lectures: gravitational waves from the early Universe**, Lectures given at Theoretical Advanced Study Institute in Elementary Particle Physics (TASI 2002): Particle Physics and Cosmology: The Quest for Physics Beyond the Standard Model(s), Boulder, Colorado, 2-28 Jun 2002 [gr-qc/0303085].
- [7] A. Buonanno and Y. Chen, **Laser-interferometer gravitational-wave optical-spring detector**, contributed talk given at the 4th Amaldi Conference on Gravitational Waves, Perth, Australia, 8-13 Jul 2001, *Class. Quant. Grav.* **19** (2002) 1569, [gr-qc/0201063].
- [8] A. Buonanno, **Gravitational waves from inspiraling binary black holes**, summary talk given at the 4th Amaldi Conference on Gravitational Waves, Perth, Australia, 8-13 Jul 2001, *Class. Quant. Grav.* **19** (2002) 1267 [gr-qc/0203030].
- [9] A. Buonanno, **The Early Universe, the Present Universe**, Proceedings of XIV SIGRAV *Congress on General Relativity and Gravity Physics*, Genoa, Italy.
- [10] A. Buonanno, **Birth of hot big-bang era in pre-big bang string cosmology**, Proceedings of *Ninth Marcel Grossmann Meeting*, 2000, Rome, Italy, Report No. GRP/00/555.
- [11] A. Buonanno and T. Damour, **Binary black hole coalescences: transition from the adiabatic inspiral to the plunge**, to be published in Proceedings of *Ninth Marcel Grossmann Meeting*, 2000, Rome, Italy [gr-qc/0011052].
- [12] A. Buonanno, **Coalescing binary systems: an effective metric approach**, Report No. IHES-P-99-33, in *Proceedings of 34th Rencontres de Moriond: Gravitational Waves and Experimental Gravity*, 1999, Les Arcs, France.
- [13] A. Buonanno, **Initial conditions in pre-big bang string cosmology**, Report No. IHES-P-99-32, *In electronic Proc. of 19th Texas Symposium on Relativistic Astrophysics: Texas in Paris*, 1998, Paris, France.
- [14] A. Buonanno, **Primeval magnetic seeds from pre-big bang string cosmology**, in *Proceedings of Moriond 98: Fundamental Parameters in Cosmology*, Les Arcs, France.

- [15] A. Buonanno, M. Maggiore and C. Ungarelli, **Stochastic background of relic gravitational waves in string cosmology**, Report No. IFUP-TH/71-96, in *Proceedings of the 12th Italian Conf. on General Relativity and Gravitational Physics*, eds. M. Bassan et al., World Scientific, Singapore, 1996.
- [16] B. Alles, A. Buonanno and G. Cella, **The two-phase issue in the  $O(n)$  non-linear sigma models: a Monte Carlo study**, LATTICE 96: 14th International Symposium on Lattice Field Theory, June 4/8, 1996, Washington University, St. Louis, USA; Nucl. Phys. Proc. Suppl. **53** (1997) 677-679 [hep-lat/9608002].

## Seminars

- May 2005, **Source modeling, detection and science of precessing compact binaries using gravitational-wave interferometers**, Theoretical Astrophysics and Relativity Group, Caltech, Pasadena.
- Jan 2005, **Quantum-optical noise in signal-recycling gravitational-wave detectors of second and third generation**, ILIAS meeting, Padova, Italy.
- Jan 2005, **Supermassive and intermediate mass black holes**, Journées LISA France, AstroParticule et Cosmologie (APC), Paris, France.
- Dec 2003, **The search for gravitational waves with ground- and space-based detectors**, Scuola Normale Superiore of Pise, Italy.
- Sep 2003, **Gravitational waves and the very early Universe**, KITP, *Superstring Cosmology Program*, Santa Barbara, CA, USA.
- Dec 2002, **The late inspiral of binary black holes: the epoch when Post-Newtonian expansion becomes suspect. Can we predict the gravitational signal?**, Department of Physics, University of Maryland, MD, USA.
- June 2002, **Quantum noise in advanced laser-interferometer gravitational-wave detectors and The late inspiral of binary black holes: How do we detect gravitational waveforms?**, National Astronomical Observatory, Tokyo, Japan.
- June 2002, **Gravitational waves from binary–black-hole inspirals**, Department of Physics, University of Tokyo, Japan.
- May 2002, **The late inspiral of binary black holes: the epoch when Post-Newtonian expansion becomes suspect. How do we detect gravitational waveforms?**, Caltech - JPL Association for Gravitational Wave Research, Caltech, Pasadena, USA.
- April 2002, **Gravitational waves from binary–black-hole inspirals**, Department of Physics, University of Florida, Gainesville, FL, USA.
- May 2001, **Advanced laser-interferometer gravitational-wave detectors: beating the standard quantum limit**, Service de Physique Théorique, Saclay, Gif-sur-Yvette, France.
- May 2001, **Gravitational waves from binary black-hole systems and Advanced laser-interferometer gravitational-wave detectors**, Department of Astronomy and Physics, University of Washington, Seattle, WA, USA.
- April 2001, **Advanced laser-interferometer gravitational-wave detectors: beating the standard quantum limit**, Department of Astronomy, University of Berkeley, CA, USA.

- May 2000, **Dangerous relics and reheating in pre-big bang string cosmology**, Fermilab Theoretical Astrophysics, Chicago, USA.
- May 2000, **Gravitational-wave research**, Service de Physique Théorique, Saclay, Gif-sur-Yvette, France.
- May 2000, **Gravitational-wave research with binary black hole systems**, Département d'Astrophysique et Cosmologie (DARC), Meudon, France.
- Oct 1999, **Coalescing binary systems and gravitational waves**, Dipartimento di Fisica, University of Pise, Italy.
- May 1999, **Effective one-body approach to inspiraling binary systems**, Service de Physique Théorique, Saclay, Gif-sur-Yvette, France.
- May 1999, **Phenomenological aspects of pre-big bang string cosmology**, Institut d'Astrophysique de Paris, Paris, France.

## Seminars at conferences and schools

- July 2007, **Binary black-hole coalescence**, (invited talk), *Astrophysics of compact objects*, Huangshan, China. Saint Louis, Missouri, USA.
- Feb 2007, **Matching analytic to numerical waveforms**, (invited talk), *Numerical Relativity meets 3 Post-Newtonian: A workshop at the interface between numerical relativity and post-Newtonian theory*, Washington University, Saint Louis, Missouri, USA.
- Dec 2006, **Probing fundamental physics and the early Universe by detecting relic gravitational waves** (plenary talk), *Texas Symposium*, Melbourne, Australia.
- Nov 2006, **Analytical methods meet numerical relativity** (invited talk), LIGO Scientific Collaboration meeting, Boston.
- July 2006, **Analytical approach to coalescing binary black holes** (plenary talk), 11<sup>th</sup> *Marcel Grossmann meeting*, Berlin, Germany.
- June 2006, **Data analysis of supermassive black holes with LISA** (plenary talk), 6<sup>th</sup> *International LISA Symposium*, Goddard Space Flight Center, Maryland, USA.
- May 2006, **Analytical modelling of binary black holes** (invited talk), Astrophysical aspects of numerical relativity, Guanajuato, Mexico.
- May 2006, **Source modeling, detection and science of gravitational waves emitted by inspiralling compact binaries** (invited talk), APS meeting, Dallas.
- Nov 2005, **Predictions for the last stages of inspiral and plunge using analytical techniques** (invited talk), Numerical Relativity 2005: Compact Binaries, NASA's Goddard Space Flight Center.
- Dec 2004, **Estimating binary parameters in alternative theories of gravity with LISA**, 9<sup>th</sup> Gravitational-Wave Data Analysis Workshop, Annecy, France.
- Dec 2004, **Advanced gravitational-wave detectors et Detecting gravitational waves from inspiralling binaries**, VIRGO-EGO Scientific Forum (VESF), Pise, Italy.
- June 2003, **Review of quantum noise in advanced laser-interferometer gravitational-wave detectors** (invited talk), *Gravitation: A Decennial Perspective*, Penn State University, USA.



- June 2003, **Overview of gravitational-wave sources for ground- and space-based detectors** (plenary talk), *CAPP 2003*, CERN, Genève, Switzerland.
- June 2003, **Gravitational waves and the early Universe** (plenary talk), CEA/SPHT: 8<sup>th</sup> Claude Itzykson Conference, Gif-sur-Yvette, France.
- Sep 2002, **Gravitational waves from early Universe: Where theoretical predictions and experiments stand** (plenary talk) *Cosmo 02, International Workshop on Particle Physics and the Early Universe*, Chicago, Illinois, USA.
- August 2002, **Detection template families for spinning binary black holes**, *LIGO Scientific Community meeting*, Hanford Observatory, WA, USA.
- March 2002, **The late inspiral of compact binaries: the epoch when post-Newtonian expansions become suspect and Gravitational waves from late stages of inspiraling black hole binaries: spinning and nonspinning case** *Sources Workshop, in Livingstone Observatory*, Louisiana, USA.
- Nov 2001, **Advanced interferometric gravitational-wave detectors** (invited talk), *Gravitational Wave Phenomenology Workshop*, Penn State University, USA.
- July 2001, **Gravitational waves from inspiraling binary black holes** (plenary talk) and **Signal-recycled gravitational-wave interferometers**, *Amaldi Conference on Gravitational Waves*, Perth, Australia.
- March 2001, **Effective-one-body approach to coalescing binary black holes, and Quantum noise in signal-recycled gravitational-wave interferometers: beating the standard quantum limit, and Spinning binary black holes: dynamics and gravitational waveforms**, *LIGO Scientific Community Meeting*, Baton Rouge, Louisiana, USA.
- Feb 2001, **Quantum nondemolition theory with LIGO-II**, *Gravitational Wave Advanced Detectors Workshop*, Aspen, Colorado, USA.
- Sep 2000, **The Early Universe, the Present Universe**, seminar for the SIGRAV prize, XIV SIGRAV *Congress on General Relativity and Gravity Physics*, Genoa, Italy.
- July 2000, **Binary black hole coalescences: transition from the adiabatic inspiral to the plunge and Birth of the hot big bang era in pre-big bang string cosmology**, 9<sup>th</sup> *Marcel Grossmann Meeting*, Rome, Italy.
- June 2000, **Late dynamical evolution of binary black holes**, *Third Capra Ranch Meeting on Gravitational Radiation Reaction*, Caltech, Pasadena, CA, USA.
- March 2000, **Binary black hole coalescences: transition from inspiral to the plunge**, 16<sup>th</sup> *Pacific Coast Gravity Meeting*, Caltech, Pasadena, CA, USA.
- July 1999, **Magnetic seeds from pre-big bang cosmology**, *Les Houches Summer School Session LXXI: The primordial Universe*, Les Houches.
- June 1999, **Could the universe have evolved from a generic classical string vacuum?**, *Current issues in string cosmology*, IHES, Bures-sur-Yvette, France.
- Jan 1999, **Coalescing binary systems: an effective metric approach**, *Moriond 99: Gravitational waves and Experimental gravity*, Les Arcs, France.
- Dec 1998, **Initial conditions in pre-big bang string cosmology**, 19<sup>th</sup> *Texas Symposium on Relativistic Astrophysics*, Paris, France.

- Avril 1998, **Classical inhomogeneities in pre-big bang cosmology: backward in time and toward the singularity**, *Annual meeting on current problems in theoretical physics*, Vietri sul Mare, Salerno, Italy.
- Jan 1998, **Primeval magnetic seeds from pre-big bang string cosmology**, *Moriond 98: Fundamental Parameters in Cosmology*, Les Arcs, France.
- August 1995, **Effective lagrangian for quantum black holes**, *14th International Conference on General Relativity and Gravitation*, Firenze, Italy.
- May 1995, **A model for quantum black holes**, *Annual Informal Meeting on Theoretical Physics*, Cortona, Italy.

## Colloquia

- March 2007, **Binary black hole coalescence**, Astronomy Department, Columbia University, NY, USA.
- Dec 2002, **Searching for gravitational waves from inspiraling binaries of compact objects with ground-based interferometers**, NASA Goddard Flight Space Center, MD, USA.
- Oct 2002, **Searching gravitational waves from binary systems**, Astrophysics Section, Physics Department at MIT, Cambridge, MA, USA.
- Feb 2002, **Experimental and theoretical aspects in the search for gravitational waves**, Kavli Institute of Theoretical Physics, University of California in Santa Barbara, USA.
- Nov 2001, **The search for gravitational waves**, Physics Department, Washington University, Seattle, WA, USA.

## Lectures at schools

- Nov 2006, **Gravitational-wave data analysis**, Lectures given at the General-relativity trimester: Gravitational waves, relativistic astrophysics and cosmology, Institut Henri Poincare, Paris, France.
- August 2006, **Gravitational waves**, Lectures given at the Fabric of Spacetime Summer School, Les Houches, France
- July 2006, **Gravitational waves**, Lectures given at the Particle Physics and Cosmology Summer School, ICTP, Trieste.
- July 2005, **Gravitational Radiation**, Lectures given at the Summer SLAC Institute, Stanford, USA.
- Sep 2004, **Gravitational waves: theory and sources**, Lectures given at XIII National School in Theoretical Physics, Parma, Italy.
- Dec 2003, **Gravitational waves**, Lectures given at Scuola Normale Superiore of Pise, Italy.
- June 2002, **Gravitational waves from the early Universe**, Lectures given at Theoretical Advanced Study Institute (TASI) in Elementary Particle Physics, University of Colorado, Boulder, Colorado, USA.

## Organization of workshops

- Feb 2006, co-organizer of *Numerical Relativity meets 3 Post Newtonian: A Workshop at the interface between numerical relativity and post-Newtonian theory*, Washington University, Saint Louis, Missouri.
- Jan 2005, co-organizer of *Journées LISA France*, AstroParticule et Cosmologie (APC), Paris.
- Dec 2004, organizer of *Source and Population Modeling for space-based detectors* session at GW-DAW, Annecy, France.
- July 2004, organizer of *Gravitational-Wave Sources: Source Science and Statistical Methods* session at GR17, Dublin, Ireland.
- June 2003, co-organizer of *Gravitational Wave Physics* session at the conference *Gravitation: A Decennial Perspective*, Penn State University, USA.
- June 1999, co-organizer of the workshop *Superstring Cosmology*, IHES, Bures-sur-Yvette, France.

### **Editorial activities**

- Referee for: Physical Review D, Physical Review Letters, Physics Letters B, JHEP, Classical and Quantum Gravity.

### **Other participations**

- Reviewer and panelist of the National Science Foundation.
- 2006-2009, member of the executive committee of the Topical Gravity Group of the American Physical Society.