Curriculum vitae

Number of pages: 15 (including this one)

Name: Carmen Molina-París

Department: Applied Mathematics

School of Mathematics

Institution: University of Leeds, UK

Date: 30th of August 2006

I. PERSONAL INFORMATION

Last name: Molina-París | Name: Carmen
Place of birth: Granada, Spain | Date of birth: 23rd of November 1968
Children: Federico (28-03-2003) | Children: Sofía (13-02-2006)
Address: Department of Applied Mathematics, University of Leeds | Telephone: 0113 343 5137
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II. EDUCATION

- **October 2001-August 2002: Research Fellow**
  Mathematics Institute, University of Warwick, UK.

- **June 2001-September 2001: Research Associate**
  Centro de Astrobiología (CSIC-INTA), Research Fellowship (Ministerio de Ciencia y Tecnología).
  Plan Nacional de I+D+I 2000-2003 under project BXX 2000-1385.

- **January 2000-May 2001: Postdoctoral**
  Centro de Astrobiología (CSIC-INTA), Postdoctoral Fellow.

- **September 1996-December 1999: Postdoctoral**
  Los Alamos National Laboratory, Postdoctoral Fellow (Director's Funded).
  Theoretical Division: T6 (Theoretical Astrophysics) and T8 (Elementary Particles and Field Theory).

- **January 1992-August 1996: Doctorate**
  Center for Relativity, Department of Physics, The University of Texas at Austin.
  Title of Doctoral Thesis: *Geometric Effective Action: Gauge Theory Without Ghosts.*
  Supervisor: Prof. Bryce DeWitt.
  Committee: Prof. Bryce DeWitt, Prof. Cécile DeWitt-Morette, Prof. Willy Fischler,
  Prof. Steve Weinberg and Prof. Karen Uhlenbeck.
  Ph.D. Defense in April 1996.
  Grade: A^+.

- **January 1990-December 1991: Master Thesis**
  Departamento de Geometría y Topología, Universidad de Granada, Spain.
  Title of Master Thesis: *Causalidad en Espaciotiempos.*
  Supervisor: Prof. Alfonso Romero Sarabia.
  Committee: Prof. Manuel Barros, Prof. Joaquín Marro and Prof. Jesús Sánchez Dehesa.
  Master Thesis Defense in July 1991.
  Grade: A^+.

- **September 1986-June 1991: Bachelor**
  Departamento de Física, Universidad de Granada, Spain.
  Bachelor Degree in Physics and specialization in Theoretical Physics awarded in June 1991.
  Marks: 13 A^+ with Honours and 11 A^+.

III. CURRENT AFFILIATION

- **September 2002: University Lecturer (tenured job)**
  Department of Applied Mathematics, School of Mathematics, University of Leeds, UK.

- **Academic Address**
  Department of Applied Mathematics, School of Mathematics,
  University of Leeds, Leeds LS2 9JT, UK.
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  FAX: +44-113-343-5090
  Electronic address: carmen@maths.leeds.ac.uk

IV. PREVIOUS SCIENTIFIC POSITIONS

DATES	POSITION	INSTITUTION
01/92 – 05/96	Teaching Assistant and Research Assistant	Physics Department The University of Texas at Austin
09/96 – 12/99	Postdoctoral Fellow	Los Alamos National Laboratory Theoretical Division
01/00 – 05/01	Postdoctoral Fellow	Centro de Astrobiología, CSIC-INTA Madrid, Spain
06/01 – 09/01	Research Associate	Centro de Astrobiología, CSIC-INTA Madrid, Spain
10/01 – 08/02	Research Fellow	Mathematics Institute University of Warwick, UK

V. PUBLICATIONS IN REFEREED JOURNALS

1. "Schwinger's Dynamical Casimir Effect: Bulk Energy Contribution," Carl Carlson, Carmen Molina París, Juan Pérez Mercader and Matt Visser. *Phys. Lett. B 395 (1997) 76–82.*
2. "Casimir Effect in Dielectrics: Bulk Energy Contribution," Carl Carlson, Carmen Molina París, Juan Pérez Mercader and Matt Visser. *Phys. Rev. D 56 (1997) 1262–1280.*
3. "Casimir Effect in Dielectrics: Density-of-States Approach," Carmen Molina París and Matt Visser. *Phys. Rev. D 56 (1997) 6629–6639.*
4. "Effective Equation of State for a Spherically Expanding Pion Plasma," Melissa Lampert and Carmen Molina París. *Phys. Rev. D 57 (1998) 83–92.*
5. "Quantum Gravity Without Ghosts," Bryce DeWitt y Carmen Molina París. *Mod. Phys. Lett. A 13 (1998) 2475–2478.*
6. "Zeta Functions, Renormalization Group Equations, and the Effective Action," David Hochberg, Carmen Molina París, Juan Pérez Mercader and Matt Visser. *Phys. Rev. Lett. 81 (1998) 4802–4805.*
7. "Renormalization Group Improving the Effective Action," David Hochberg, Carmen Molina París, Juan Pérez Mercader and Matt Visser. *Int. J. Mod. Phys. A 14 (1999) 1485–1522.*
8. "Minimal Conditions for the Creation of a Friedman-Robertson-Walker Universe from a Bounce," Carmen Molina París and Matt Visser. *Phys. Lett. B 455 (1999) 90–95.*
9. "Tolman Wormholes Violate the Strong Energy Condition," David Hochberg, Carmen Molina París and Matt Visser. *Phys. Rev. D 59 (1999) 044011.*
10. "Effective Action for Stochastic Partial Differential Equations," David Hochberg, Carmen Molina París, Juan Pérez Mercader and Matt Visser. *Phys. Rev. E 60 (1999) 6343–6360.*
11. "Energy-Momentum Tensor of Particles Created in an Expanding Universe," Salman Habib, Carmen Molina París and Emil Mottola. *Phys. Rev. D 61 (1999) 024010.*
12. "Effective Potential for the Massless KPZ Equation," David Hochberg, Carmen Molina París, Juan Pérez Mercader and Matt Visser. *Physica A 280 (2000) 437–455.*
13. "One-loop $\lambda\phi^4$ Theory in Robertson-Walker Spacetimes: Adiabatic Regularization and Analytic Approximations," Carmen Molina París, Paul R. Anderson and Stephen A. Ramsey. *Phys. Rev. D 61 (2000) 127501.*
14. "Effective Potential for the Reaction–Diffusion–Decay System," David Hochberg, Carmen Molina París, Juan Pérez Mercader and Matt Visser. *J. Statist. Phys. 99 (2000) 903–941.*
15. "Geometrodynamics of Variable-Speed-of-Light Cosmologies," Bruce Bassett, Stefano Liberati, Carmen Molina París and Matt Visser. *Phys. Rev. D 62 (2000) 103518.*
16. "Attractor States and Infrared Scaling in de Sitter Space," Paul R. Anderson, Wayne Eaker, Salman Habib, Carmen Molina París and Emil Mottola. *Phys. Rev. D 62 (2000) 124019.*

17. "Small-scale Properties of the KPZ Equation and Dynamical Symmetry Breaking," David Hochberg, Carmen Molina París, Juan Pérez Mercader and Matt Visser. *Phys. Lett. A 278 (2001) 177–183.*

18. "Heat Kernel Regularization of the Effective Action for Stochastic Reaction–Diffusion Equations," David Hochberg, Carmen Molina París and Matt Visser. *Phys. Rev. E 63 (2001) 036132.*

19. "One-loop Graviton Corrections to Maxwell's Equations," Diego A.R. Dalvit, Francisco D. Mazzitelli and Carmen Molina París. *Phys. Rev. D 63 (2001) 084023.*

20. "Diffusion-limited Reaction in One Dimension: Paired and Unpaired Nucleation," Salman Habib, Katja Lindenberg, Grant D. Lythe and Carmen Molina París. *J. Chem. Phys. 115 (2001) 73.*

21. "Duration and Fitness-Dependence of Quasispecies Memory," Carmen M. Ruiz-Jarabo, Armando Arias, Carmen Molina-París, Carlos Briones, Eric Baranowski, Cristina Escarmís and Esteban Domingo. *J. Mol. Bio. 315(3) (2002) 285–296.*

22. "Complex Dynamics of Tumors: Modeling an Emerging Brain Tumour System with Coupled Reaction-Diffusion Equations," Salman Habib, Carmen Molina-París and Thomas S. Deisboeck. *Physica A* **327***, 524 (2003).*

23. "Linear Response and the Validity of the Semi-Classical Approximation in Gravity," Paul R. Anderson, Carmen Molina-París and Emil Mottola. *Physical Review D* **67***, 024026 (2003).*

24. "The Inflationary Perturbation Spectrum," Salman Habib, Katrin Heitmann, Gerard Jungman and Carmen Molina-París. *Physical Review Letters* **89***, 281301 (2002).*

25. "Large Scale Features of Rotating Forced Turbulence," David Hochberg, José Gaite and Carmen Molina-París. *Physical Review E* **67***, 026304 (2003).*

26. "Thymic Presentation of Autoantigens and the Efficiency of Negative Selection," Hugo A. van den Berg and Carmen Molina-París. *Journal of Theoretical Medicine* **5***, 1–22 (2003).*

27. "Memory in Retroviral Quasispecies: Evidence and Theoretical Model for Human Immunodeficiency Virus," Carlos Briones, Esteban Domingo and Carmen Molina-París. *Journal of Molecular Biology* **331***, 213-229 (2003).*

28. "Characterizing Inflationary Perturbations: The Uniform Approximation," Salman Habib, Andreas Heinen, Katrin Heitmann, Gerard Jungman and Carmen Molina-París. *Physical Review D* **70***, 083507 (2004).*

29. "*Short-distance and initial state effects in inflation: stress tensor and decoherence,*" Paul R. Anderson, Carmen Molina-París and Emil Mottola. *Physical Review D* **72***, 043515 (2005).*

30. "Tumor growth instability and the onset of invasion," Mario Castro, Carmen Molina-París and Thomas S. Deisboeck. *Physical Review E* **72***, 041907 (2005).*

31. " Memory in Retroviral Quasispecies: Evidence and Theoretical Model for Human Immunodeficiency Virus," Carlos Briones, Aránzazu de Vicente, Carmen Molina-París and Esteban Domingo. *Accepted for publication in Gene (2006).*

VI. PUBLICATIONS IN PROCEEDINGS

32. "Gauge Theory Without Ghosts," Bryce DeWitt and Carmen Molina París. *Proceedings of the Sixth Moscow Quantum Gravity Seminar (Sakharov Conference) 1996, ed. Victor Berezin.*

33. "Gauge Theory Without Ghosts," Bryce DeWitt and Carmen Molina París. *Functional Integration: Basics and Applications (NATO Advanced Study Institute, Cargèse, September 1996, 327–361), ed. P. Cartier, C. DeWitt-Morette and A. Folacci (Plenum Publishing Co., 1997).*

34. "Energy-Momentum Tensor and Particle Creation in the de Sitter Universe," Carmen Molina París. *Proceedings of the 8th Marcel Grossmann Meeting on Recent Developments in Theoretical and Experimental General Relativity, Gravitation and Relativistic Field Theories 1997, 827–829.*

35. "Energy-Momentum Tensor in a de Sitter Universe," Carmen Molina París. *Proceedings of the Fourth Workshop on Quantum Field Theory under the Influence of External Conditions, Leipzig, Germany, September 1998, ed. Michael Bordag.*

36. "Energy-Momentum Tensor in an Expanding Universe," Salman Habib, Carmen Molina París and Emil Mottola. *Proceedings of Cosmo 98, Asilomar, Monterey, November 1998, ed. David Caldwell. AIP Conference Proceedings* **478**, *269–272 (1999).*

37. "Adiabatic Interpretation of Particle Creation in a de Sitter Universe," Carmen Molina París. *Int. J. of Theor. Phys. 38 (1999) 1273–1297.*

38. "Interacting Fields in Friedman-Robertson-Walker Spacetimes: Analytic Approximation and Reheating," Carmen Molina París. *Proceedings of Cosmo 99, ICTP Trieste, Italy, September 1999.*

39. "Chi-Variable-Speed-of-Light Cosmologies," Bruce Bassett, Stefano Liberati, Carmen Molina París and Matt Visser. *Proceedings of the 3rd Meeting on Constrained Dynamics and Quantum Gravity (QG 99), Villasimius, Sardinia, Italy; Nucl. Phys. Proc. Suppl. 88 (2000) 259–262.*

40. "Attractor states and quantum instabilities in de Sitter space," Paul R. Anderson, Wayne Eaker, Salman Habib, Carmen Molina París and Emil Mottola. *Proceedings of the 5th Peyresq Meeting 2000, Peyresq, France. Int. J. of Theor. Phys. 40 (2001) 2217–2229.*

41. "Interacting Field Theories in Robertson-Walker Spacetimes: Analytic Approximations," Carmen Molina París, Paul R. Anderson and Stephen Ramsey. *Proceedings of the 5th Peyresq Meeting 2000, Peyresq, France. Int. J. of Theor. Phys. 40 (2001) 2231–2258.*

42. "Magnetohydrodynamic Turbulence in Protostars," Carmen Molina-París, David Hochberg, José Gaite and Juan Pérez-Mercader. *Proceedings of the Second Granada Workshop, The Evolving Sun and its Influence on Planetary Environments, (2001). Astronomical society of the pacific conference series 269, 307–312 (2002).*

43. "A Methodology for Analyzing Predictions from Slow-roll Inflation: Preliminary Results," Salman Habib, Katrin Heitmann, Gerard Jungman, Carmen Molina-París and Anupam Singh. *Proceedings of Cosmo 01, Rovaniemi, Finland, September 2001.*

VII. PUBLICATIONS SENT TO JOURNAL AND/OR ARCHIVES

44. "Effective Potential for Classical Field Theories Subject to Stochastic Noise," David Hochberg, Carmen Molina París, Juan Pérez Mercader and Matt Visser. cond-mat/9904207.

VIII. MASTER THESIS AND DOCTORAL THESIS

- "Causalidad en Espaciotiempos". *Tesina de Licenciatura, Universidad de Granada, Código PROV T-11-99, 1991.*
- "Geometrical Effective Action: Gauge Field Theory Without Ghosts ". *Ph. D. Thesis, UMI-96-33240-mc (microfiche), 140 pages, 1996.*

IX. PARTICIPATION IN RESEARCH PROJECTS (current)

- Principal investigator: José Gaite, *Formación de estructuras en Astrofísica y Cosmología*, Plan Nacional de I+D+I 2002-2005 Spain, IMAFF, CSIC, Spain, October 2002–October 2006
- Carmen Molina-París, *Back-reaction and validity of the semi-classical approximation to cosmology: a theoretical and numerical approach*, The Nuffield Foundation, March 2003–August 2005
- Principal investigator: N. Cohen, *Modelling bacterial gene networks from continuous-culture DNA microarray recordings*, Discipline Hopping Award, MRC-EPSRC, June 2004–June 2005
- Carmen Molina-París, *Compressible hydrodynamics in accreting systems*, Leverhulme Research Fellowship, The Leverhulme Trust, May 2005–May 2007

X. PARTICIPATION IN RESEARCH PROJECTS (previous)

- TITLE: *Non-Equilibrium Science: Assesment, Control, and Prediction*
  FINANCING INSTITUTION: Los Alamos National Laboratory-Department of Energy
  RESEARCH CENTRE: Los Alamos National Laboratory
  FROM: 1998 UNTIL: 2003
  PRINCIPAL INVESTIGATOR: Emil Mottola
- TITLE: *General introduction to early cosmology, large scale structure of the universe and galaxy formation and its importance*
  FINANCING INSTITUTION: IGPP (University of California and Los Alamos National Laboratory)
  RESEARCH CENTRE: Los Alamos National Laboratory
  FROM: 1998 UNTIL: 2001
  PRINCIPAL INVESTIGATOR: Emil Mottola
- TITLE: *Astrobiología: una aproximación interdisciplinar a la vida en el Universo*
  FINANCING INSTITUTION: Plan Nacional de I+D+I 2000-2003
  RESEARCH CENTRE: Centro de Astrobiología (CSIC-INTA)
  FROM: 2000 UNTIL: 2003
  PRINCIPAL INVESTIGATOR: Juan Pérez Mercader
- TITLE: *Modelling stochastic activation of T cells*
  FINANCING INSTITUTION: EPRSC, UK
  RESEARCH CENTRE: Mathematics Institute, University of Warwick
  FROM: 2000 UNTIL: 2002
  PRINCIPAL INVESTIGATOR: Nigel J. Burroughs

XI. TEACHING EXPERIENCE

- **Academic Year 2006-2007** Lecturer, Shool of Mathematics, University of Leeds. Courses in Calculus and Mathematical Analysis, Partial Differential Equations and Mathematical Biology. Tutor to Joint Honours Students.
- **Academic Years 2002-2003, 2003-2004, 2004-2005 and 2005-2006** Lecturer, Shool of Mathematics, University of Leeds. Courses in Fundamentals of Particle Dynamics and Foundation Year in Applied Mathematics.
- **Academic Year 2001-2002** Undergraduate Tutor, Mathematics Institute, University of Warwick. Courses in Analysis, Foundations, Geometry, Probability and Differential Equations.
- **Spring Semester 1996** Research Assistant, Department of Physics, The University of Texas at Austin.
- **Fall Semester 1995** Lecturer, Department of Physics, The University of Texas at Austin.
- **Spring Semester 1995** Teaching Assistant, Department of Physics, The University of Texas at Austin.
- **Spring and Fall Semesters 1994, 1993, 1992** Teaching Assistant, Department of Physics, The University of Texas at Austin.

XII. RESEARCH VISITS (current)

- Los Alamos National Laboratory, Material Science, X-7, Dean Preston and Robert Singleton, *Origin and amplification of chirality in amino acids*, August 2002. Supported by LANL.
- Departamento de Física Fundamental, Barcelona, Spain, Enric Verdaguer, *Validity of the semi-classical approximation to gravity*, October 2002. Supported by University of Leeds and Universidad de Barcelona.
- Department of Mathematics, University of Victoria, New Zealand, Matt Visser, *Semi-classical gravity*, December 2002. Locally supported by University of Victoria.

- IMAFF, CSIC, Madrid, Spain, José Gaite, *Compressible Hydrodynamics and Spherical Accretion*, November 2003. Supported by IMAFF.
- Departamento de Astronomía y Astrofísica, Valencia, Spain, José María Ibañez, *Compressible Hydrodynamics*, November 2003. Supported by Universidad de Valencia.
- Los Alamos National Laboratory, Theoretical Division, Elementary Particles and Field Theory, Emil Mottola, Salman Habib and Paul Anderson, *Validity of the semi-classical approximation to quantum fields in the early universe*, August 2003. Supported by LANL.
- Los Alamos National Laboratory, Theoretical Division, Elementary Particles and Field Theory, Emil Mottola and Paul Anderson, *Short-distance and initial time effects in cosmology*, August 2004. Supported by LANL and University of Leeds.
- University of California, Berkeley, Physics Department, Edgar Knobloch, *Spherical accretion and compressible instabilities* July 2005. Supported by University of Leeds.
- Los Alamos National Laboratory, Theoretical Division, Elementary Particles and Field Theory, Emil Mottola and Paul Anderson, *Conformal anomaly and instability of de Sitter spacetime* August 2005. Supported by LANL and University of Leeds.

XIII. RESEARCH VISITS (previous)

KEY: D = doctoral, P = postdoctoral, I = invited, O = other (specify).

INSTITUTION: Los Alamos National Laboratory, Material Science, X-7
CITY: Los Alamos, NM COUNTRY: USA YEAR: July-August 2001 LENGTH: 1 month
SUBJECT: Origin and amplification of amino acid chirality
COLLABORATION: Dean Preston and Robert Singleton KEY: I

INSTITUTION: Los Alamos National Laboratory, Material Science, X-7
CITY: Los Alamos, NM COUNTRY: USA YEAR: April-May 2001 LENGTH: 2 weeks.
SUBJECT: Origin and amplification of amino acid chirality
COLLABORATION: Dean Preston and Robert Singleton KEY: I

INSTITUTION: Los Alamos National Laboratory, Theoretical Division, Elementary Particles and Field Theory
CITY: Los Alamos, NM COUNTRY: USA YEAR: November-December 2000 LENGTH: 1 month.
SUBJECT: Validity of the semiclassical approximation
COLLABORATION: Salman Habib and Emil Mottola KEY: I

INSTITUTION: Department of Chemistry and Biochemistry, University of California, San Diego
CITY: San Diego, CA COUNTRY: USA YEAR: November 2000 LENGTH: 1 week.
SUBJECT: Reaction-diffusion and prebiotic systems
COLLABORATION: Katja Lindenberg KEY: I

INSTITUTION: Los Alamos National Laboratory, Theoretical Division, Elementary Particles and Field Theory
CITY: Los Alamos, NM COUNTRY: USA YEAR: April 2000 LENGTH: 1 month.
SUBJECT: Attractor states in de Sitter space
COLLABORATION: Salman Habib and Emil Mottola KEY: I

INSTITUTION: Department of Chemistry and Biochemistry, University of California, San Diego
CITY: San Diego, CA COUNTRY: USA YEAR: March 2000 LENGTH: 1 week.
SUBJECT: Reaction-diffusion in one-dimensional systems
COLLABORATION: Katja Lindenberg KEY: I

INSTITUTION: Astrophysics Sector, SISSA
CITY: Trieste COUNTRY: Italy YEAR: October 1999 LENGTH: 2 weeks.
SUBJECT: Variable-speed-of-light cosmologies
COLLABORATION: Bruce Basset, Stefano Liberati and Dennis Sciama KEY: I

INSTITUTION: Physics Department, Wake Forest University
CITY: Winston-Salem, NC COUNTRY: USA YEAR: August 1999 LENGTH: 1 week.
SUBJECT: Interacting fields in curved spacetime
COLLABORATION: Paul Anderson KEY: I

INSTITUTION: Department of Physics, Washington University
CITY: St. Louis, MS COUNTRY: USA YEAR: April 1999 LENGTH: 2 weeks.
SUBJECT: Variable speed of light cosmologies
COLLABORATION: Matt Visser and Stefano Liberati KEY: I

INSTITUTION: Department of Physics, University of Heidelberg
CITY: Heidelberg COUNTRY: Germany YEAR: June 1998 LENGTH: 1 week.
SUBJECT: Non-equilibrium effective action
COLLABORATION: Christof Wetterich KEY: I

INSTITUTION: Department of Physics, University of Leipzig
CITY: Leipzig COUNTRY: Germany YEAR: June 1998 LENGTH: 1 week.
SUBJECT: Initial value problems in quantum fields in FRW spacetimes
COLLABORATION: Michael Bordag and Joachim Lindig KEY: I

INSTITUTION: Mathematics Department, Trinity College
CITY: Dublin COUNTRY: Ireland YEAR: May 1998 LENGTH: 2 weeks.
SUBJECT: Back-reaction in gravitational fields
COLLABORATION: James Sexton KEY: I

INSTITUTION: Relativity Group, University of Maryland
CITY: Washington D.C. COUNTRY: USA YEAR: March 1998 LENGTH: 2 weeks.
SUBJECT: Reheating and preheating in the early universe
COLLABORATION: Bei-lok Hu and Stephen Ramsey KEY: I

INSTITUTION: Department of Physics, Washington University
CITY: St. Louis, MS COUNTRY: USA YEAR: November 1997 LENGTH: 2 weeks.
SUBJECT: Surface contribution to the Casimir energy
COLLABORATION: Matt Visser KEY: I

INSTITUTION: Los Alamos National Laboratory, Theoretical Division, Elementary Particles and Field Theory
CITY: Los Alamos, NM COUNTRY: USA YEAR: 1996-1999 LENGTH: 39 months.
SUBJECT: Back-reaction and test field approximation in gravitational fields
COLLABORATION: Fred Cooper, Salman Habib and Emil Mottola KEY: P

INSTITUTION: Centre for Relativity, Physics Department, The University of Texas at Austin
CITY: Austin, TX COUNTRY: USA YEAR: 1992-1996 LENGTH: 54 months.
SUBJECT: Gauge invariant effective action
COLLABORATION: Bryce DeWitt KEY: D

XIV. RESEARCH VISITS (IN SPAIN)

KEY: D = doctoral, P = postdoctoral, I = invited, O = other (specify).

INSTITUTION: Laboratorio de Astrofísica Espacial and Física Fundamental
CITY: Villafranca del Castillo, Madrid COUNTRY: Spain YEAR: June-July 1997 LENGTH: 2 months.
SUBJECT: Ecuaciones diferenciales estocásticas
COLLABORATION: Juan Pérez Mercader, David Hochberg and Matt Visser KEY: I

INSTITUTION: Laboratorio de Astrofísica Espacial and Física Fundamental
CITY: Villafranca del Castillo, Madrid COUNTRY: Spain YEAR: June-July 1996 LENGTH: 2 months.
SUBJECT: Efecto Casimir en dieléctricos
COLLABORATION: Carl Carlson, Juan Pérez Mercader and Matt Visser KEY: I

XV. MEETINGS

TITLE: Geometric Effective Action and New Feynman Rules for Yang-Mills Fields and Fermions
CONTRIBUTION: Invited talk
MEETING: *12th Pacific Coast Gravity Meeting*
CITY: Salt Lake City, Utah, USA. YEAR: 1996

TITLE: Energy-Momentum Tensor and Particle Production in the de Sitter Universe
CONTRIBUTION: Invited talk
MEETING: *The 8th Marcel Grossmann Meeting*
CITY: Jerusalem, Israel. YEAR: 1997

TITLE: Energy-Momentum Tensor and Adiabatic Particle Production in the de Sitter Universe
CONTRIBUTION: Invited talk
MEETING: *Midwest Gravity Meeting*
CITY: Washington University, St. Louis, Missouri, USA. YEAR: 1997

TITLE: Back-reaction problem in a Friedmann-Robertson-Walker universe
CONTRIBUTION: Invited talk
MEETING: *Quantum Gravity Meeting in the Southern Cone*
CITY: Bariloche, Argentina. YEAR: 1998

TITLE: Effective Action: Geometrical Approach and New Results
CONTRIBUTION: Invited talk
MEETING: *Argentinian Symposium in High Energy Physics*
CITY: Bariloche, Argentina. YEAR: 1998

TITLE: Energy-momentum Tensor in a de Sitter Universe
CONTRIBUTION: Invited talk
MEETING: *Fourth Workshop on Quantum Field Theory under the Influence of External Conditions*
CITY: Leipzig, Germany. YEAR: 1998

TITLE: Energy-Momentum Tensor in an Expanding Universe
CONTRIBUTION: Invited talk
MEETING: *Cosmo 98*
CITY: Asilomar, Monterey, California, USA. YEAR: 1998

TITLE: Effective Action for Stochastic Partial Differential Equations
CONTRIBUTION: Invited talk
MEETING: *Stochastic evolutionary equations*
CITY: Los Alamos, New Mexico, USA. YEAR: 1999

TITLE: Effective Action for Reaction-diffusion Systems
CONTRIBUTION: Invited poster
MEETING: *FisEs 99*
CITY: Santander, Spain. YEAR: 1999

TITLE: Interacting fields in Friedmann-Robertson-Walker spacetimes
CONTRIBUTION: Invited talk
MEETING: *Cosmo 99*
CITY: Trieste, Italy YEAR: 1999

TITLE: Effective Potential for the Reaction-diffusion-decay System
CONTRIBUTION: Invited poster
MEETING: *First Annual NASA Astrobiology Science Conference*
CITY: NASA Ames Research Centre, San Jose, USA. YEAR: 2000

TITLE: Sistemas de Reacción-difusión: Dinámica de Tumores cerebrales
CONTRIBUTION: Invited talk
MEETING: *No Lineal 2000*
CITY: Almagro, Ciudad Real, Spain YEAR: 2000

TITLE: Interacting Field theories in Robertson-Walker Spacetimes: Analytic Approximations
CONTRIBUTION: Invited talk
MEETING: *Peyresq 5*
CITY: Peyresq, France YEAR: 2000

TITLE: Sistemas de Reacción-difusión
CONTRIBUTION: Invited poster
MEETING: *FisEs 2000*
CITY: Santiago de Compostela, La Coruña, Spain YEAR: 2000

TITLE: Magnetohydrodynamic Turbulence in Protostars
CONTRIBUTION: Invited poster
MEETING: *Second Granada Workshop, The Evolving Sun and its Influence on Planetary Environments*
CITY: Granada, Spain YEAR: 2001

TITLE: Mathematical model of T cell activation
CONTRIBUTION: Invited talk
MEETING: *No Lineal 2002*
CITY: Cuenca, Spain YEAR: 2002

TITLE: The thymic contribution to T cell tolerance
CONTRIBUTION: Invited talk
MEETING: *FisEs 03*
CITY: Pamplona, Spain YEAR: 2003

TITLE: Mathematical model of T cell activation
CONTRIBUTION: Invited talk
MEETING: *Panda meeting*
CITY: Leeds, UK YEAR: 2004

TITLE: Linear response and the validity of the semi-classical approximation in gravity
CONTRIBUTION: Invited poster
MEETING: *Jenam 04*
CITY: Granada, Spain YEAR: 2004

TITLE: What triggers the onset of tumor cell invasion?
CONTRIBUTION: Invited poster
MEETING: *FisEs 05*
CITY: Madrid, Spain YEAR: 2005

XVI. WORKSHOPS

CONTRIBUTION: Invited to attend
WORKSHOP: *Kansas Gravity Meeting*
CITY: The University of Kansas, Lawrence, Kansas, USA. YEAR: 1997

TITLE: Interacting Fields in Curved Spacetimes
CONTRIBUTION: Invited talk
WORKSHOP: *Non-Equilibrium Quantum Fields*
CITY: INT, University of Washington, Seattle, USA. YEAR: 1999

CONTRIBUTION: Invited to attend
WORKSHOP: *Structure Formation and Dark Matter: Theory versus Observations*
CITY: St. John's College, Santa Fe, New Mexico, USA YEAR: 1999

TITLE: Energy-Momentum Tensor in a de Sitter universe
CONTRIBUTION: Invited talk
WORKSHOP: *Non-Equilibrium Quantum Fields*
CITY: ITP, University of California, Santa Barbara, California, USA. YEAR: 1999

CONTRIBUTION: Invited to attend
WORKSHOP: *Structure Formation and Dark Matter: Theory versus Observations*
CITY: St. John's College, Santa Fe, New Mexico, USA YEAR: 2001

CONTRIBUTION: Invited to attend
WORKSHOP: *Immunology, Ecology and Epidemiology Workshop*
CITY: Isaac Newton Institute, Cambridge YEAR: 2001

XVII. SEMINARS

- **June 2004** "Mathematical model of T cell activation". Departamento de Química, Universidad de San Pablo (CEU), Madrid, Spain.
- **June 2004** "Mathematical model of T cell activation". Mathematics Institute, University of Oxford, UK.
- **May 2004** "Mathematical model of T cell activation". Applied Mathematics Department, University of Glasgow, UK.
- **April 2004** "Linear response and the validity of the semi-classical approximation in gravity". Applied Mathematics and Physics Departments, University of Leeds, UK.
- **November 2003** "Compressible turbulence in spherical accretion". Departamento de Astronomía y Astrofísica, Universidad de Valencia, Spain.
- **November 2003** "Linear response and the validity of the semi-classical approximation in gravity". IMAFF, CSIC, Madrid, Spain.
- **November 2003** "The thymic contribution to T cell tolerance". Departamento de Física, Universidad de Málaga, Spain.
- **December 2002** "Mathematical model of T cell activation". Mathematics Department, University of Victoria, Wellington, New Zealand.
- **November 2002** "Mathematical model of T cell activation". Mathematics Department, University of Queensland, Brisbane, Australia.
- **October 2001** "Large Scale Features of Rotating Incompressible Hydrodynamics". Department of Astronomy and Astrophysics, Universidad de Valencia.
- **May 2001** "Reaction-diffusion: Application to Origin and Amplification of Chirality". Mathematics Institute, University of Warwick.
- **May 2001** "Origin and amplification of chirality in amino acids", Centro de Astrobiología (CSIC-INTA), Madrid.
- **January 2001** "Interacting Fields in FRW Cosmological Models", Universidad Autónoma, Cantoblanco, Madrid.
- **November 2000** "Interacting Fields and Back-reaction", Theory Division, Los Alamos National Laboratory.
- **October 1999** "$T_{\mu\nu}$ and Particle Production: Test Field and Back-Reaction", SISSA, Astrophysics Sector, Trieste, Italy.
- **August 1999** "Early Universe Cosmology: Big Bang and Inflation", Wake Forest University, Winston-Salem, North Carolina.
- **February 1999** "Energy-Momentum Tensor in a de Sitter Cosmology: Test Field and Back-Reaction", Center for Relativity, The University of Texas at Austin.
- **September 1998** "Geometric Effective Action: Gauge Theories without Ghosts", Physics Department of the University of Jena, Germany.
- **July 1998** "Energy-Momentum Tensor in a Friedmann-Robertson-Walker Universe: test field and back-reaction calculation", Physics Department of the University of Heidelberg, Germany.
- **June 1998** "Energy-Momentum Tensor in a Friedmann-Robertson-Walker Universe", Physics Department of the University of Leipzig, Germany.

- **May 1998** "Energy-Momentum Tensor in a Friedmann-Robertson-Walker Universe", Trinity College, Mathematics Department, Dublin, Ireland.
- **November 1997** "Energy-Momentum Tensor and Adiabatic Particle Production in the de Sitter Universe", Washington University, St. Louis, Missouri.
- **September 1997** "Particle Production in the de Sitter Universe", The University of Texas at Austin.
- **December 1996** "Quantum Field Theory in Curved Spacetimes: Large N expansion", LAEFF, Madrid, Spain.
- **November 1996** "Casimir Energy in Dielectrics", Los Alamos National Laboratory.
- **September 1996** "Casimir Energy in Dielectrics", The University of Texas at Austin.
- **July 1996** "Geometric Effective Action: Gauge Field Theory Without Ghosts," LAEFF, Madrid, Spain.
- **November 1995** "Geometric Effective Action: Gauge Field Theory Without Ghosts", The University of Texas at Austin.
- **July 1995** "Geometric Effective Action and New Feynman Rules", LAEFF, Madrid, Spain.
- **April 1995** "Effective Action and Wick Rotation", The University of Texas at Austin.
- **June 1993** "Topological Quantum Field Theory", Universidad de Granada, Spain.
- **May 1992** "Causality in Spacetimes", The University of Texas at Austin.

XVIII. SUMMER SCHOOLS

- **July 1998** Summer School in Cosmology and Particle Physics, ICTP, Trieste, Italy.
- **July 1997** Summer School in El Escorial, Universidad Complutense de Madrid, Spain. "A bridge between the Big-Bang and Biology".
- **Verano 1994** Summer School in Les Houches. Session LXII, "Quantum and Statistical Field Theory". Les Houches, France.
- **Verano 1992** OTAN Advanced Institute and XXIII GIFT International Seminar on Theoretical Physics. "Recent Problems in Mathematical Physics". Salamanca, Spain.
- **Otoño 1991** Universidad Internacional Menéndez Pelayo. Summer School "Beyond the Standard Model". Valencia, Spain.
- **Verano 1990** Universidad Internacional Menéndez Pelayo. Summer School "Astrophysics in the 90's". Valencia, Spain.

XIX. COMPUTATIONAL BACKGROUND

- Mathematics Institute, University of Warwick. C-programming for T-cell activation model. User since October 2001.
- Wake Forest University Computing Facility (High Performance Supercomputing), Wake Forest University, Winston-Salem, North Carolina. User since January 2001.
- NERSC Computing Facility (High Performance Supercomputing), Lawrence Berkeley National Laboratory, California. User since January 1997.
- ACL Computing Facility (High Performance Supercomputing), Los Alamos National Laboratory. User since January 1998 until December 1999.

XX. LANGUAGES (A = average , W = well, V = very well)

LANGUAGE	SPEAK	READ	WRITE
Inglés	V	V	V
Alemán	V	V	V
Francés	A	W	W

XXI. FELLOWSHIPS, AWARDS, AND OTHER MERITS

December 2001:

- Grant to attend the Immunology, Ecology and Epidemiology Workshop at the Isaac Newton Institute, Cambridge

Contrato Ramón y Cajal 2001:

- Contrato Ramón y Cajal with the contribution:
- *Ecuaciones Diferenciales Parciales Estocásticas: Turbulencia Magnetohidrodinámica en Discos Protoestelares*
- Realización en el Departamento de Astronomía y Astrofísica, Universidad de Valencia.

Honourable Mention May 1998:

- Honourable Mention in the Essay Competition of the Gravity Research Foundation 1998 with the contribution
- *Quantum Gravity without Ghosts*
- Collaboration with Prof. Bryce DeWitt, Center for Relativity, the University of Texas at Austin.

June 1998:

- Marie Curie Training and Mobility Fellowship with the contribution
- *Numerical and Theoretical Studies of the Back-reaction in the Early Universe*
- Collaboration with Dr. James Sexton, Mathematics Department, Trinity College, Dublin, Ireland.

January 1998:

- NSF Grant to attend the Quantum Gravity Meeting in the Southern Cone, Bariloche, Argentina.

July 1997:

- Fellowship Universidad Complutense to attend the Summer School "A bridge between the Big-Bang and Biology", El Escorial, Madrid, Spain.

June 1997:

- NSF Grant to attend the 8th Marcel Grossmann Meeting, Jerusalem, Israel.

March 1996:

- Travel Grant from The University of Austin, to attend the Pacific Coast Gravity Meeting, Salt Lake City, Utah.

July 1994:

- NATO Grant to attend the Les Houches Summer School.

Summers 1993, 1994, 1995:

- Research Assistant with Prof. Bryce DeWitt of the Center for Relativity at the University of Texas at Austin.

June 1992:

- NATO Grant to attend International Seminar on Theoretical Physics, Salamanca, Spain.

Fellowship CSIC:

- **Summers 1991 and 1990**
- Fellowship Introducción a la Investigación del CSIC, Spain.
- Tutors: Juan Pérez Mercader (CSIC, Madrid) and Adolfo de Azcárraga Feliú (CSIC, Valencia).

Referee:

- Physical Review D (since 1997),
- Zentralblatt (since 2001),
- Journal of Theoretical Medicine (since 2002),
- Physics Letters A (since 2002),
- Physical Review Letters (since 2002),
- Journal of Theoretical Biology (since 2005).

XXI. RESEARCH COLLABORATIONS

- "Semi-classical approximation to gravity and its validity" with Prof. Paul Anderson (Univ. Wake Forest) and Dr. Emil Mottola (Los Alamos National Laboratory).
- "Compressible hydrodynamics in accreting systems" with Prof. Edgar Knobloch (Physics, UC Berkeley).
- "Origin of chirality in aminoacids: reaction-diffusion approach" with Dr. Dean Preston and Dr. Robert Singleton (Los Alamos National Laboratory).
- "Mathematical model of tumour proliferation and invasion" with Dr. Thomas Deisboeck (Harvard Medical School), Salman Habib (Los Alamos National Laboratory), Brian Sleeman (University of Leeds) and Mario Castro (Universidad Pontificia de Comillas).
- "Mathematical model of T cell activation" with Dr. Hugo van den Berg, Dr. Nigel Burroughs, and Prof. David Rand (University of Warwick and University of Canterbury).
- "Memory in viral quasispecies" with Prof. Esteban Domingo (UAM) and Dr. Carlos Briones (CSIC-INTA).

XXII. REFEREES

1. Professor Katja Lindenberg

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   Telephone: 1-(858) 534-3285

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2. Professor Philip Maini

   Address: Centre for Mathematical Biology, Mathematics Institute, 24-29 St. Giles, Oxford OX1 3LB

   Telephone: 01865-280617

   Fax: 01865-273583

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3. Professor James Sneyd

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4. Professor Matt Visser

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