CURRICULUM VITAE

Name: Guillermo Raúl Zemba

Birth Date: December 7, 1959

Citizenship: Argentinian

Marital Status: Single

Military Status: compulsory draft into Argentinian Army (1978/9)

Present Position: Researcher of C.N.E.A. (Atomic Energy Agency of Argentina)
Assistant Professor, Instituto Balseiro (National University of Cuyo)

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Research Areas:

Applications of effective field theories to Statistical and Condensed Matter systems. Conformal Field Theories.Bosonization.

Goal : Establishing in Argentina a group devoted to the study and applications of Conformal Field Theories.

Education:

5/1991: **Ph.D. in Physics**, Massachusetts Institute of Technology (U.S.A.); thesis supervisor: Prof. B. Zwiebach. Thesis title: *Topics in Two Dimensional Quantum Gravity and Chern-Simons Gauge Theories.*

3/1985: **Licenciature in Physics**, Universidad de Buenos Aires, Buenos Aires (Argentina); thesis supervisor: Prof. M. C. Cambiaggio.
Thesis title: *Approximate methods in exactly solvable Many-Body systems.*

Research Experience:

9/93-2/96 : I.N.F.N. Postdoctoral Fellowship at the Department of Theoretical Physics, University of Torino (Italy).

9/91-8/93 : Postdoctoral Fellowship at the Theory Group in C.E.R.N. (Switzerland).

8/91-today : Reviewer for *Nucl.Phys* **B**, *Phys. Lett.* **B** and *Math. Rev.*.

6/87-6/91 : Research Assistant in the Center for Theoretical Physics, Massachusetts Institute of Technology (U.S.A.).

1985/6: graduate research in Theoretical Nuclear Physics at Tandar Lab. (C.N.E.A. - Atomic Energy Agency of Argentina), under the supervision of Prof. D. Bes.

Teaching Experience:

3/96: Graduate and Undergraduate Physics courses at Instituto Balseiro (Argentina).

2/95-2/96: Invited lectures for undergradute students on advanced topics in Quantum Mechanics,University of Torino. Part of these lectures will be published in a book in preparation with Prof. S. Fubini.

11/92-12/92: Advanced graduate level course on the *Quantum Hall Effect*, University of Buenos Aires and C.N.E.A.

9/86-5/87: Teaching Assistant, Department of Physics, M.I.T.

11/83-7/86: Teaching Assistant, Department of Physics, Universidad de Buenos Aires (Argentina).

Research direction:

3/98: Research director of Dr. Ana Lopez (CONICET, Argentina).

Thesis direction:

7/96: Ph.D. Thesis advisor of Lic. Marina Huerta, graduate student at Instituto Balseiro (FOMEC Fellowship). Topic of research: applications of conformal field theories to condensed matter systems.

7/96: Licenciature Thesis advisor of Henry David Herce (Instituto Balseiro).

9/93-9/97: Ph.D. Thesis research guidance of Raffaele Cariacciolo, graduate student at the University of Turin. Research topic: bosonization in condensed matter systems.

Grants:

Research Grant, Fundación Antorchas (Argentina) (1996,1997 and 1998).

Travel Grant, Fundación Antorchas (Argentina) (1996 and 1997).

CONICET grant for the organization of the *VII Simposio Argentino de Física Teórica de Partículas y Campos*, S. C. de Bariloche, January 1998

Fundación Antorchas grant for the organization of the *VII Simposio Argentino de Física Teórica de Partículas y Campos*, S. C. de Bariloche, January 1998

Distinctions and Fellowships:

Fulbright Visiting Scientist Award (1997-8).

Bourse Haute Niveau CIES, Ministère de l'Education Nationale, de l'Enseignement Supérieur et de la Recherche (France), (1997).

Associate Member of the International Centre for Theoretical Physics, Trieste (Italy), (1997-2002).

I.N.F.N. (Italy) Postdoctoral Fellowship, (1993/5).
World Laboratory Postdoctoral Fellowship (1991/3).
Ph.D. fellowship C.N.E.A. (Argentina), (1985/6).

Organization duties:

Member of the Organizing Committee of the *VII Simposio Argentino de Física Teórica de Partículas y Campos*, S. C. de Bariloche, January 1998 (URL: http://cabtep5.cnea.edu.ar/symp.html).

Coordinator of the Particles and Fields Division of the Asociación Física Argentina (since 1996).

Languages: Spanish, English, French, Italian.

Extracurricular activities:

Member of the Sigma Xi Scientific Society (1991-1992).
Founding member and organizer of *Club Argentino*, M.I.T. (1988).

Invited lectures and conference talks

7/98: Invited lecture at the *III Workshop on Statistical Field Theory*, I.C.T.P. (Trieste), Italy.

8/96: Invited lecture at the *Workshop on low-dimensional Field Theories*, Telluride Academy, Telluride, CO, U.S.A.

3/96: Invited seminar at the *First meeting of the Argentinian collaboration in the Auger Project*, La Plata, Argentina.

7/95: Invited participation in the program on Field Theories and Symmetries Benasque Center for Physics, Benasque, Spain.

6/95: Invited talk at the workshop on *Condensed Matter Theories, CMT19*, International Center for Advanced Studies (I.D.E.A.), Caracas, Venezuela.

1/95: Invited lecturer at the *Sixth Argentinian Symposium on Theoretical Particle Physics and Field Theory*, Instituto Balseiro, S. C. de Bariloche, Argentina.

8/94: Invited talk at the workshop on $(2+1)$-*dimensional Physics*, NORDITA, Copenhagen, Denmark.

5/94: Invited talk at the conference on *Statistical Mechanics and Quantum Field Theory*, University of Southern California, U.S.A.

9/93: Invited talk at the conference on *Condensed Matter and High Energy Physics*, Chia Laguna, Italy.

7/93: Invited talk at the conference on *W-algebras and their potential applications*, L.A.A.P., Annecy, France.

Invited talks

At the following Institutes and Physics Departments: University of Barcelona (Spain), University of Bonn (Germany), Brandeis University (U.S.A.), Brown University (U.S.A.), University of Buenos Aires (Argentina), C.N.E.A. (Tandar Laboratory, National Atomic Comission of Argentina),C.P.T. Marseille (France), Ecole Normale Supérieure du Lyon (France), University of Florence (Italy), Geneva University (Switzerland), Harvard University (U.S.A.), Instituto Balseiro (Argentina), L.A.P.P. Annecy (France), Oxford University (U.K.), University of La Plata (Argentina), Los Alamos National Lab. (U.S.A.), Massachusetts Institute of Technology (U.S.A.), University of Turin (Italy), University of Stockholm (Sweden), University of Uppsala (Sweden).

Scientific Publications

Research Works

1. H. D. Herce and G. R. Zemba, ‘A new class of Matrix Models arising from the $W_{1+\infty}$ Algebra’, *Phys. Lett.* **B 537** (2002) 141-146.
2. A. Cappelli, M. Huerta and G. R. Zemba,‘Thermal Transport in Chiral Conformal Theories and Hierarchical Quantum Hall States’, *Nucl. Phys.* **B 636** (2002) 568-582.
3. E. Fradkin, M. Huerta and G. R. Zemba, ‘Effective Chern-Simons Theories of Pfaffian and Parafermionic Quantum Hall States, and Orbifold Conformal Field Theories’, *Nucl. Phys.* **B 601** (2001) 591-606 .
4. A. Cappelli and G. R. Zemba, ‘Hamiltonian formulation of the $W_{1+\infty}$ Minimal Models’, *Nucl. Phys.* **B 540** (1999) 610-638.
5. A. Cappelli, C. Méndez, J. M. Simonin, Guillermo R. Zemba, ‘Numerical Study of Hierarchical Quantum Hall Edge States on the Disk Geometry’, *Phys. Rev.* **B 58** (1998) 16291-16304.
6. A. Cappelli and G. R. Zemba, ‘Modular Invariant Partition Functions in the Quantum Hall Effect’, *Nucl. Phys.* **B 490** (1997) 595-632.
7. M. Frau, A. Lerda, S. Sciuto and G. R. Zemba, ‘Algebraic Bosonization: the study of the Heisenberg and Calogero-Sutherland Models’,*Int. J. Mod. Phys.* **A 12** (1997) 4611.
8. R. Caracciolo, A. Lerda and G. R. Zemba, ‘The $W_{1+\infty}$ effective theory of the Calogero-Sutherland model’, *Phys. Lett.* **B 352** (1995) 304-313.
9. A. Cappelli, C. A. Trugenberger and G. R. Zemba, ‘Stable Quantum Hall fluids as $W_{1+\infty}$ minimal models’, *Nucl. Phys.* **B 448** (1995) 470-504.
10. A. Cappelli, C. A. Trugenberger and G. R. Zemba, ‘$W_{1+\infty}$ dynamics of edge excitations in the quantum Hall effect’, *Ann. Phys.* **246** (1996) 86-120.
11. A. Cappelli, C. A. Trugenberger and G. R. Zemba, ‘Classification of Quantum Hall Universality Classes by $W_{1+\infty}$ symmetry’, *Phys. Rev. Lett.* **72** (1994) 1902-1905.
12. A. Cappelli, C. A. Trugenberger and G. R. Zemba, ‘Large N Limit in the Quantum Hall Effect’, *Phys. Lett.* **B 306** (1993) 100-107.
13. A. Cappelli, G. V. Dunne, C. A. Trugenberger and G. R. Zemba, ‘Conformal Symmetry and Universal Properties of Quantum Hall States’, *Nucl. Phys.* **B 398** (1993) 531-567.
14. A. Cappelli, C. A. Trugenberger and G. R. Zemba, ‘Infinite Symmetry in the Quantum Hall Effect’, *Nucl. Phys.* **B 396** (1993) 465-490.
15. M. Saadi and G. Zemba, ‘The cubic matrix model with imaginary coupling and 2D gravity’, *Int. J. Mod. Phys.* **A 7** (1992) 501-534.
16. M. Camperi, F. Levstein and G. Zemba, ‘The large N limit of Chern-Simons Gauge Theory’, *Phys. Lett.* **B 247** (1990) 549-554.
17. G. Zemba, ‘An interpretation of the Abelian Chern-Simons vacuum holonomy’, *Int. J. Mod. Phys.* **A 5** (1990) 559-570.
18. G. Zemba and B. Zwiebach, ‘Tadpole Graph in Covariant Closed String Field Theory’, *J. Math. Phys.* **30** (1989) 2388-2396.

19. D. R. Bes, J. Kurchan, M. T. Mehr and G. R. Zemba, 'The perturbative treatment of a superfluid system', *Nucl. Phys.* **A 471** (1987) 565-586.
20. M. C. Cambiaggio, J. Dukelsky and G. R. Zemba, 'Validity of the self-consistent Cranking Approximation in the SU(3)-U(5) phase transition', *Phys. Lett.* **B 162** (1985) 203-207.
21. M. C. Cambiaggio, J. Dukelsky and G. R. Zemba, 'Constrained Hartree approximation for systems with many interacting bosons', *J. Phys.* **G 11** (1985) L163-L168.

Proceedings of International Conferences

1. A. Cappelli, C. A. Trugenberger and G. R. Zemba, '$W_{1+\infty}$ field theories for the edge excitations in the Quantum Hall Effect', proceedings of the 1996 Summer Telluride workshop on *Low dimensional field theories*, Telluride (U.S.A.), G. Dunne ed., *Int. J. Mod. Phys.* **A 12** (1997) 1101.

2. M. Frau, A. Lerda, S. Sciuto and G. R. Zemba, 'The extended conformal theory of Luttinger systems', proceedings of the *II International Sakharov Conference on Physics*, Moscow, Russia, 5/96, A. Semikhatov et al. eds. and of the *Workshop on Low Dimensional Field Theories*, Telluride Academy, 8/96, G. Dunne Ed., *Int. J. Mod. Phys.* **A 12** (1997) 1113.

3. R. Caracciolo, M. Frau, A. Lerda, S. Sciuto and G. R. Zemba, 'The extended conformal theory of the Calogero-Sutheland model', proceedings of the conference on *Common Trends in Condensed Matter and High Energy Physics IV*, Chia Laguna, Italy, 9/95, L. Alvarez-Gaumé et al. eds., hep-th/9604009.

4. A. Cappelli, C. A Trugenberger and G. R. Zemba, '$W_{1+\infty}$ Minimal Models and the Hierarchy of the Quantum Hall effect ', preprint DFTT-36/95, proceedings of the workshop on *Condensed Matter Theories, CMT19*, International Center for Advanced Studies (I.D.E.A.), Caracas(Venezuela), 6/95, E. Ludena et al. eds., and of the school *Low-Dimensional Models in Statistical Physics and Quantum Field Theory*, Schladming (Austria), 3/95 and of the conference on *Recent developments in Statistical Mechanics and Quantum Field Theory*, ICTP Trieste (Italy), 4/95, H. Saleur et al. eds., *Nucl. Phys.* **B** (Proc. Suppl.) **45 A** (1996) 112-119.

5. A. Cappelli, C. A Trugenberger and G. R. Zemba, 'Quantum Hall Fluids as $W_{1+\infty}$ Minimal Models', preprint DFTT-10/95, hep-th/9502050, proceedings of the conference on *Statistical Mechanics and Quantum Field Theory*, University of Southern California, Los Angeles, U.S.A., 5/94, H. Saleur ed., and of the summer school on *Particles, Fields and Strings*, Banff (Canada), 8/94.

6. A. Cappelli, G. V. Dunne, C. A. Trugenberger and G. R. Zemba, 'Symmetry aspects and finite-size scaling of Quantum Hall fluids', proceedings of the conference on *Common Trends in Condensed Matter and High Energy Physics III*, Chia Laguna, Italy,

9/92, , L. Alvarez-Gaumé et al. eds., *Nucl. Phys.* **B** (Proc. Suppl.) **33 C** (1993) 21-34.

7. D. R. Bes, J. Kurchan, M. T. Mehr and G. R. Zemba, 'Perturbative approach to a superfluid system', in *Proceedings of the IX Workshop in Nuclear Physics* , Buenos Aires 1986, World Scientific (1987), p. 507.

8. M. C. Cambiaggio, J. Dukelsky and G. R. Zemba, 'Cranked Hartree-Bose approximation in the SU(3)-U(5) phase transition', in *Nuclear Structure, Reactions and Symmetries* , Vol.II, World Scientific (1986), p. 1042.

Scientific References

Prof. Luis Alvarez-Gaumé, Theory Group, C.E.R.N., CH-1211 Genève 23, Switzerland; *e-mail: luis.ALVAREZ-GAUME@cern.ch.*

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