

# CURRICULUM VITAE

(November, 2019)

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Birthday: November 18, 1952.  
Nationality: Chilean, Rut: 6.820.724-K.  
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## Place of Work:

Facultad de Física,  
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## Present Position

Profesor Titular Ordinario from the Instituto de Física, Facultad de Física,  
Pontificia Universidad Católica de Chile.

## Academic Degrees

- Licenciado en Física,  
Universidad de Chile, January 1977.
- Licenciado en Interpretación Musical Superior, mención Viola,  
Pontificia Universidad Católica de Chile, December 1977.
- Doktor der Naturwissenschaften (Physik),  
Universität Hamburg, Germany, October 1982.

## Teaching experience

- Teaching of several courses for under-and graduate students, at the Facultad de Física of the Pontificia Universidad Católica de Chile.
- Part-time Professor at the Facultad de Ciencias Físicas y Matemáticas of the Universidad de Chile, between September 1986 and December 1995.

## Field of Research

- Theoretical High Energy Physics; (Elementary Particles and Quantum Field Theory)

## Distinctions

- Fellow of the Royal Society of South Africa, since November 2010.
- Prize for Teaching Excellence (Excelencia Docente) 2010, Pontificia Universidad Católica de Chile
- Associate member of the ICTP-SAIFR, (International Center for Theoretical Physics, South American Institute for Fundamental Research) Sao Paulo, Brazil. Since Octubre 2013
- Medalla Sociedad Chilena de Física, awarded during the XXI Chilean Symposium of Physics, November 2018, Antofagasta

## Fellowships

- German Service for academic exchange (DAAD), February 1979-September 1982.
- PNUD Program, January-March 1985, 1986.
- Research trip to Cape Town, Fundación Andes, April 1989.
- Reinvitation, German Service for Academic Exchange (DAAD), June-July 1991.
- Conicyt, support for the visit of Prof. C. A. Domínguez (University of Cape Town), December 1992 and January 1995 in the frame of the International Scientific Collaboration Program Chile-South Africa (CONYCIT-FRD).
- Fundación Andes support for the visit of Prof. Yasushi Fujimoto (Tokyo University), March-May 1993, in the frame of the Visiting Scientists Program by Fundación Andes.
- Fundación Andes Support for the visit of Prof. C. A. Domínguez (University of Cape Town), November 1993-January 1994, in the frame of the visiting Scientists Program by Fundación Andes.
- Sabatical Fellowship (trip to Cape Town), Fundación Andes, October-November 1996.

## Students Guidance

- Práctica de Licenciatura, Magdalena Sanhueza Tohá: “Efectos Supercríticos y el Potencial  $\delta$  de Dirac”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, January 1988.
- Master of Science Thesis (Tesis de Magister), Carlos Contreras Hidalgo: “Anomalía Axial y Vida Media del  $\pi^0$  a Temperatura Finita”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, December 1988.
- Práctica de Licenciatura, Juan Cristobal Rojas Gómez-Lobo: “Modelo de la Bolsa y Deconfinamiento Inducido por la Temperatura”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, January 1989.
- Práctica de Licenciatura, Santiago Pérez Oyarzún: “Deconfinamiento Térmico en Modelos Híbridos: Influencia del Tamaño Finito de la Bolsa”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, January 1993.

- Ph.D. Thesis, Juan Cristobal Rojas Gomez-Lobo: “Lagrangianos Efectivos en Teoría Cuántica de Campos a Temperatura Finita”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, January 1994.
- Master of Science Thesis (Tesis de Magister), Cristian Valenzuela: “Renormalones a Temperatura Finita”. Facultad de Física, (together with the Engineering Faculty), Pontificia Universidad Católica de Chile. Degree, January 2000.
- Ph.D Thesis, Hernán Castillo. “The Nucleon Electromagnetic Form Factor at Finite Temperature”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, January 2003.
- Ph.D Thesis, Cristián Villavicencio. “Chiral Dynamics and Pion Properties at Finite Temperature and Isospin Chemical Potential”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, December 2004.
- Práctica de Licenciatura, Sebastián Mendizabal. “Propiedades de Estados de Scattering con Potenciales Singulares en la Ecuación de Dirac”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, January 2002.
- Práctica de Licenciatura, Jorge Pinochet. “La Paradoja de Einstein-Podolsky-Rosen y el Teorema de Bell”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, January 2003.
- Master of Science Thesis (Tesis de Magister), Sebastián Mendizabal: “Modelo de Weinberg-Salam a Temperatura y Densidad Finita”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree May 2005 .
- Práctica de Licenciatura, Juan Ignacio Jottar. “Efectos Térmicos y de densidad en la producción de Dileptones”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, January 2005.
- Práctica de Licenciatura, Jimmy Muñoz. “Algunos Efectos Térmicos en QED”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, July 2005.
- Práctica de Licenciatura, Raúl Antonio Santos Sanhueza. “Modelo de Higgs a Temperatura y Densidad Finita: Comparación entre distintos gauges”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, August 2006.
- Práctica de Licenciatura, Mauricio Andrés Ipinza Torres. “Correcciones de Temperatura al acoplamiento de Yukawa en el Modelo Estándar”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, August 2006.

- Práctica de Licenciatura, Mohamed Luis El-Sheikh Muñoz. “Efectos de Temperatura y Potencial Químico de Isospín en el modelo  $\sigma$ -lineal”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, August 2006.
- Práctica de Licenciatura, Hector Martínez. “Ecuación de Dirac térmica: Discusión y aplicación en Scattering Mott”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, August 2007.
- Práctica de Licenciatura, Cristián Martínez Martínez. “Correcciones térmicas a las longitudes de scattering pion-pion en el modelo sigma lineal”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, August 2007.
- Master of Science Thesis, Tesis de Magíster, Jorge Ruiz. “Longitudes de scattering pion-pion térmicas en el modelo de Nambu-Jona-Lasinio”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, April 2008.
- Master of Science Thesis, Tesis de Magíster, Raúl Santos. “Copias de Gribov y potencial químico”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree May 2009.
- Master of Science Thesis, Tesis de Magíster, Mauricio Ipinza. “Non Linear Effects in Quantum Electrodynamics”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, April 2009.
- Master of Science Thesis, Tesis de Magíster, Valeria Boccoardo. “A discussion of surviving charmonium and bottonium states beyond the critical temperature”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, January 2009.
- Master of Science Thesis, Tesis de Magíster, Cristian Martínez. “Uncertainties in the semihadronic  $\tau$  decays and a new perturbative expansion (Incertezas en la evaluación del decaimiento semihadrónico del leptón tau y una nueva expansión perturbativa)”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, June 2010.
- Práctica de Licenciatura, Pablo Morales Rodríguez. “Real Time Formalism extension of the non local Nambu Jona Lasinio model”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, January 2010.
- Práctica de Licenciatura, Federico Márquez. “A Discussion of the Non-Relativistic Limit of the Dirac Equation for Different Potentials”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, August 2010.

- Práctica de Licenciatura, Renato Zamora Jofre. “Discusión de la Ecuación de Dirac en Ciertos Potenciales Especiales”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, August 2010.
- Práctica de Licenciatura, Carlos Paredes. “Aspectos del quiebre de simetría en el modelo sigma lineal en presencia de potencial químico bariónico”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, August 2011
- Práctica de Licenciatura, Enrico Schiappacasse. “Modelo de Nambu Jona Lasinio y transiciones de fase”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree August 2011
- Master Thesis, Dante Carcamo: “An Extension of the Landau Problem to Quantum Field Theory”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree June 2013. Coadvisor, J. Gamboa.
- Ph.D Thesis, Federico Marquez: “Hadronic Phase Transitions in Nonlocal Nambu-Jona-Lasinio Models”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, December 2014.
- Ph.D Thesis, Renato Zamora Jofré: “Non-local models and phase transitions”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, January 2015.
- Ph.D Thesis, David Valenzuela: “Algunos efectos de  $QED_{2+1}$  aplicados a la física del grafeno”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, June 2016 .
- Master Thesis, Leandro Monje: “Magnetic corrections to  $\pi$ - $\pi$  scattering lengths in the linear sigma model”. Facultad de Física, Pontificia Universidad Católica de Chile. Degree, June 2018.
- Práctica de Licenciatura, Malaquías Correa: “Renormalones con correcciones magnéticas en una teoría escalar”’. Degree, July 2018.

## Supervision of Postdocs

- Postdoc Fondecyt Project, Nr. 3010059, by Dr. G. X. Peng, September 2001-September 2002
- Postdoc Fondecyt Project, Nr. 3080029, by Dr. Iván González, 2008-October 2009
- Postdoc Proyecto Bicentenario, Dr. Cristian Valenzuela, 2009-2011

## Attendance of Conference and Meetings

- Summer School, Bad-Honnef (Germany), September 1980.
- Summer School, Erice, Sicily (Italy), August 1982.
- 3rd-12th Simposio Chileno de Física
- XXIII International Conference on High Energy Physics, Berkeley, USA, July 1986
- Escuela Latinoamericana de Física, ELAF 87, La Plata, Argentina, July 1987
- Encuentro Latinoamericano de Física de Alta Energía, Valparaíso, Chile, December 1987.
- XXIV International Conference on High Energy Physics, München, Germany, August 1988
- QCD, Twenty Years Later, Aachen, Germany, June 1992
- Escuela Latinoamericana de Física, ELAF 93, Mar del Plata, Argentina, July 1993
- European High Energy Physics Conference, Marseille, France, July 1993
- 27th International Conference on High Energy Physics, Glasgow, Scotland, July 1994
- European High Energy Physics Conference, Brussels, Belgium, July 1995
- Pierre Auger Project, First Latin American Workshop, Bariloche, Argentina, October 1995
- 28th International Conference on High Energy Physics, Warsaw, Poland, July 1996
- High Energy Physics International Euroconference on Quantum Chromodynamics, QCD 97, Montpellier, France, July 1997
- High Energy Physics International Euroconference on Quantum Chromodynamics, QCD 98, Montpellier, France, July 1998
- 29th International Conference on High Energy Physics, Vancouver, Canada, July 1998
- High Energy Physics International Euroconference on Quantum Chromodynamics, QCD 99, Montpellier, France, July 1999

- High Energy Physics International Euroconference on Quantum Chromodynamics, QCD 00, Montpellier, France, July 2000
- International Europhysics Conference on High Energy Physics, Budapest, Hungary, July 2001
- High Energy Physics International Euroconference on Quantum Chromodynamics, QCD 02, Montpellier, France, July 2002
- Relativistic Quantum Coulomb Systems, Santiago, Chile, August 2002
- High Energy Physics International Euroconference on Quantum Chromodynamics, QCD 03, Montpellier, France, July 2003
- IX Hadron Physics and VII Relativistic Aspects of Nuclear Physics, Angra dos Reis, Brazil, March 2004
- High Energy Physics International Conference on Quantum Chromodynamics, QCD 04, Montpellier, France, July 2004
- High Energy Physics International Conference on Quantum Chromodynamics, QCD 05, Montpellier, France, July 2005
- High Energy Physics International Conference on Quantum Chromodynamics, QCD 06, Montpellier, France, July 2006
- Physics in the LHC Era, UTFSM, Valparaíso, Chile, December 2006
- II Latin American Workshop on High Energy Phenomenology, São Miguel das Missões, RS, Brazil, December 2007
- Standar Model and Beyond in the LHC Era, UTFSM, Valparaíso, Chile, January 2008
- High Energy Physics International Conference on Quantum Chromodynamics, QCD 08, Montpellier, France, July 2008
- Relativistic Aspects of Nuclear Physics, RANP 08, Rio de Janeiro, Brazil, November 2008
- Nonlinear Effects in Quantum Electrodynamics, NITheP, Stellenbosch, South Africa, September 2009
- VIII latin American Symposium on Nuclear Physics and Applications, Santiago, Chile, December 2009
- High Energy Physics in the LHC Era: 3<sup>rd</sup> International Workshop. January 4-8, 2010. Valparaíso, Chile
- XI Hadron Physics. March 21-26, 2010. Maresías, Sao Paulo, Brazil



- High Energy Physics International Conference on Quantum Chromodynamics, QCD 10, Montpellier, France, June-July 2010
- SILAFAE 2010, Simposio latinoamericano de Física de Altas Energías, Valparaíso, December 2010
- 3rd International Workshop on Nonlinear QED, Cape Town, South Africa, 3-14 de Enero 2011
- Third International Workshop on Non Perturbative Aspects of Field Theory, Morelia, Mexico, 4-8 of April 2011
- Valparaíso International Symposium on Particle Physics, Valparaíso, 19-20 of May 2011.
- Encuentro Chileno de Física de Altas Energías (En Recuerdo de Olivier Espinosa). Santiago, USACH, 23-24 of May 2011
- High Energy Physics in the LHC Era: 4<sup>th</sup> International Workshop. 4-10 of January, 2012. Valparaíso, USM, Chile
- Many Manifestations of Nonperturbative QCD. Caraguatatuba, Sao Paulo, Brazil, April 30th - May 5th, 2012
- 16th High Energy Physics International Conference in Quantum Chromodynamics, QCD 12. Montpellier, France, 2-6 of July 2012
- High Energy Physics in the LHC Era, 5<sup>th</sup> International Workshop, Valparaíso, Chile, UTFSM, 16-20 of January 2013
- 17th High Energy Physics International Conference in Quantum Chromodynamics, QCD 14. Montpellier, France, 30 of June-4 of July 2014
- 7th International Conference on Quark and Nuclear Physics, QNP2015, Valaparaíso, Chile, UTFSM, March 2-6, 2015
- 18th High Energy Physics International Conference in Quantum Chromodynamics, QCD 15. Montpellier, France, 29 June-4 July 2015
- Worksho/School on Behaviour of Matter at Extreme Temperatures and Magnetic Fields, University of Cape Town, South Africa, November 16-27, 2015
- 6th International Workshop on High Energy Physics in the LHC Era, Universidad Técnica Federico Santa María, Valparaíso, Chile, January, 6-12, 2016
- Workshop on Magnetic Fields in Hadron Physics, ICTP-SAIFR, Sao Paulo, Brasil, 9-13 de Mayo 2016. Organizer and Speaker.

- 20th High Energy Physics International Conference in Quantum Chromodynamics, QCD 15. Montpellier, France, 3-7 July 2017
- XLVII International Symposium on Multiparticle Dynamics (ISMD2017) Tlaxcala, México, September 11-15 2017
- 7th International Conference on High Energy Physics in the LHC Era, Valparaíso, Chile, January 8-12 2018
- Many Manifestations of Non-Perturbative QCD, Sao Paulo (Camburi) Brazil, 30th of April-5th of May 2018
- Cosmology and Particles, Chillán, Chile, 12-14 de Junio 2019
- 22th High Energy Physics International Conference in Quantum Chromodynamics, QCD 15. Montpellier, France, 2nd-5th July 2019

## Publications

### International Publications:

1. “The Non-Forward QCD Ladder Diagrams”, Zeitschrift für Physik, Particles & Fields, **C12** (1982) 263. (With J. Bartels)
2. “Improved Description of the Small-x Limit of Deep Inelastic Scattering”, Zeitschrift für Physik, Particles & Fields, **C17** (1983) 69.
3. “On the Small-x Region of Deep Inelastic Scattering”, DESY Internal Report-T-82-01
4. “Chiral and Flavor  $SU(2)$  and  $SU(3)$  Symmetry Breaking in Quantum Chromodynamics”, Physical Review **D31** (1985) 2930. (With C. A. Dominguez)
5. “Determination of the Gluon Condensate and the Four Quark Condensate via FESR”, Zeitschrift für Physik, Particles & Fields, **C39** (1988) 231. (With R. A. Bertlmann, C. A. Dominguez, M. Perrottet and E. de Rafael).
6. “The Triangle Diagram at Finite Temperature”, Zeitschrift für Physik, Particles & Fields, **C40** (1988) 253. (With C. Contreras)
7. “Deconfinement and Chiral-Symmetry Restoration at Finite Temperature”, Physics Letters **B233** (1989) 201. (With C. A. Dominguez)

8. "Supercritical Effects and the  $\delta$ -Potential", Journal of Physics, Mathematical and General, **A23** (1990) 553. (With M. Sanhueza)
9. "The Linear  $\sigma$ -Model and Finite Temperature Effects", International Journal of Modern Physics, **A5** (1990) 2297. (With C. Contreras)
10. "Transition to Color Deconfinement in QCD", Nuclear Physics **B (Proc. Suppl.)16** (1990) 403. (With C. A. Dominguez).
11. "Dilepton Production in Nuclear Collisions", Proceedings of the conference "Phase Structure of Stringly Interacting Matter". Cape Town, January 1990. Springer-Verlag. J. Cleymans Ed. Page 277. (With C. A. Dominguez)
12. "Dimuon Production in Ultrarelativistic Nuclear Collisions and QCD Phase Transitions", Zeitschrift für Physik, Particles & Fields, **C49** (1991) 423. (With C. A. Dominguez)
13. "QCD Sum Rules at Finite Temperature", Zeitschrift für Physik, Particles & Fields, **C51** (1991) 69. (With C. A. Dominguez)
14. "Thermal Effects and the Effective Action of Quantum Electrodynamics", Physical Review **D46** (1992) 2689. (With J. C. Rojas)
15. "Measurement of Hot Spots inside the Proton at HERA and LEP/LHC", Zeitschrift für Physik, Particles & Fields, **C54** (1992) 653. (With J. Bartels and A. De Roeck)
16. "Hybrid Models at Finite Temperature and Deconfinement", Physics Letters **B300** (1993) 278 - 282. (With H. Falomir and J. C. Rojas)
17. "Temperature Dependence of the rho-Meson Mass and Width", Zeitschrift für Physik, Particles & Fields, **C59** (1993) 63 - 65. (With C. A. Dominguez and J. C. Rojas)
18. "Nucleon Propagator at Finite Temperature", Zeitschrift für Physik, Particles & Fields, **C58** (1993) 273 - 277. (With C. A. Dominguez)
19. "On the Infinite Order Resummation of Some Finite Temperature Diagrams", Modern Physics Letters **A9** (1994) 705 - 713. (With Y. Fujimoto and J. C. Rojas) Erratum in Modern Physics Letters **A9** (1994) 1519.

20. “Pion and Nucleon Thermal Widths in the Linear Sigma-Model”, Physics Letters **320** (1994) 377 - 380. (With C. A. Dominguez and J. C. Rojas)
21. “On the Finite Size of the Bag and the Critical Deconfining Temperature in Hybrid Models”, Physics Letters **B322** (1994) 413 - 418. (With S. Pérez-Oyarzún)
22. “Electromagnetic Pion Form Factor at Finite Temperature”, Physics Letters **B335** (1994) 506 - 509. (With C. A. Dominguez and J. S. Rozowsky)
23. “Dimensional Regularization at Finite Temperature”, Zeitschrift für Physik, Particles & Fields, **C64** (1994) 495 - 498. (With Y. Fujimoto and J. C. Rojas)
24. “Confined Two-Dimensional Fermions at Finite Density”, Physical Review **D52** (1995) 7132 - 7139. (With M. De Francia, H. Falomir and E. M. Santangelo)
25. “Comment on Current Correlators in QCD at Finite Temperature”, Physical Review **D52** (1995) 3143 - 3146. (With C. A. Dominguez)
26. “Pions at Finite Temperature from QCD Sum Rules”, Physics Letters **B387** (1996) 151. (With C. A. Dominguez and M. S. Fetea)
27. “Massless Fermions in a Bag at Finite Density and Temperature”, Physical Review **D55** (1997) 2477 - 2485. (With M. De Francia and H. Falomir)
28. “The GMOR Relation at Finite Temperature”, Nuclear Physics **B (Proc. Suppl.) 54A** (1997) 333. (With C. A. Dominguez and M. Fetea).
29. “Vector Meson Dominance and  $g_{\rho\pi\pi}$  at Finite Temperature from QCD Sum Rules”, Physics Letters **B406** (1997) 149. (With C. A. Dominguez and M. Fetea)
30. “The  $\rho$  Meson and the Thermal Behavior of an Effective Coupling Constant”, Nuclear Physics **B (Proc. Suppl.) 64** (1998) 498. (With C. A. Dominguez and M. Fetea)
31. “Pion Nucleon Coupling at Finite Temperature”, Physics Letters **B. B429** (1998) 64. (With C. A. Dominguez and C. van Gend)
32. “Finite Density and Temperature in Hybrid Models”, Phys. Rev. **C60**(1999)

055203 (With M. De Francia and H. Falomir)

33. “Two perspectives for the thermal behavior of an effective hadronic coupling constant”, Nuclear Physics **B (Proc. Suppl.)** **74** (1999) 163. (With C. A. Dominguez and C. van Gend)

34. “QCD Sum Rule Determination of the Axial-Vector Coupling of the Nucleon at Finite Temperature”, Physics Letters B. **B460** (1999) 442. (With C. A. Dominguez and V. van Gend)

35. “Thermal behavior of the axial vector coupling constant”, Nuclear Physics **B (Proc. Suppl.)** **86** (2000) 413. (With C. A. Dominguez and C. van Gend)

36. “Thermal Renormalons in Scalar Field Theory”, Modern Physics Letters **A** **15**(2000) 1181 (With C. Valenzuela)

37. “Axial Anomaly, Vector Meson Dominance and  $\pi^0 \rightarrow \gamma\gamma$  at Finite Temperature”, Physics Letters B. **481** (2000) 295-298. (With C. A. Dominguez)

38. “The Dirac Equation with a  $\delta$  Potential”, Journal of Physics A, Mathematical and General **33** (2000) 5315. (With R. Benguria and H. Castillo)

39. “Casimir Energy for a Scalar Field with a Frequency Dependent Boundary Condition”, Physical Review **D63** (2000) 025015. (With H. Falomir and K. Rébora)

40. “Vector Meson Dominance, Axial Anomaly and the Thermal behavior of  $g_{\rho\omega\pi}(T)$ ”, Nuclear Physics **B (Proc. Suppl.)** **96** (2001) 184. (With C. A. Dominguez)

41. “Non-Commutative Quantum Mechanics”, Physical Review **D64** (2001) 067901. (With J. Gamboa and J. C. Rojas)

42. “Is Spacetime Non-Commutative?”, January 2001, hep-th/0101081. (With J. Gamboa and J. C. Rojas)

43. “The Landau Problem and Noncommutative Quantum Mechanics”, Modern Physics Letters **A16** (2001) 2075. (With J. Gamboa, F. Méndez and J. C. Rojas)

44. “Noncommutative Quantum Mechanics: The Two-dimensional Central Field”, International Journal of Modern Physics **A17** (2002) 2555. (With J.

Gamboa, F. Méndez and J. C. Rojas)

45. “Testing Spatial Noncommutativity via the Aharonov-Bohm Effect, Physical Review **D66** (2002) 045018. (With H. Falomir, J. Gamboa, F. Méndez and J. C. Rojas)

46. “Thermal Pions and Isospin Chemical Potential Effects”, Nuclear Physics **B (Proc. Suppl.) 121** (2003) 291.(With C. Villavicencio)

47. “Another Approach to the In-Medium Chiral Condensates”, Physics Letters B. **548** (2002) 189-195. (With G. X. Peng, U. Lombardo and H. C. Chiang)

48. “Thermal Pions at Finite Isospin Chemical Potential”, Physical Review **D67** (2003) 074034. (With C. Villavicencio)

49. “Chiral Condensates in Quark and Nuclear Matter”, International Journal of Modern Physics **A18** (2003) 3151.(With G. X. Peng, U. Lombardo, H. C. Chiang and P. Z. Ning)

50. “Central Charges and Effective Action at Finite Temperature and Density”, Modern Physics Letters **A19**(2004) 223. (With J. Gamboa, F. Méndez and J. López-Sarrión)

51. “A new Treatment of the In-Medium Chiral Condensate””, Nuclear Physics **B (Proc. Suppl.) 133** (2004) 259.(With G. X. Peng, U. Lombardo and X. J. Wen)

52. “Relativistic Scattering with a Singular Potential in the Dirac Equation”, quant-ph/0402030. (With S. Mendizabal)

53. “Thermal pion masses in the second phase”, Physical Review **D70** (2004) 074005. (With C. Villavicencio)

54. “Pion Dynamics at Finite Temperature and Density”, IX Hadron Physics and VII Relativistic Aspects of Nuclear Physics. A Joint Meeting on QCD and QGP, Rio de Janeiro, Brazil 28 March-3 April 2004. AIP Conference Proceedings 739, (2004) 225. Editors M. E. Bracco, M. Chiapparini, E. Ferreira, T. Kodama (With C. Villavicencio)

55. “Quantum Theory of Tensionless Noncommutative p-Pranes”, Physical Review **D70** (2004) 106006. (With J. Gamboa and F. Méndez)

56. “Weinberg-Salam Model at Finite Temperature and Density”, Physics Letters B. **B609** (2005) 437.(With S. Mendizabal and J. C. Rojas)
57. “Topological Field Configurations in the Presence of Isospin Chemical Potential”, Physics Letters B. **B609** (2005) 437. (With S. Mendizabal and J. C. Rojas)
58. “Two-flavor Condensates in Chiral Dynamics: Temperature and Isospin Density Effects”, Physical Review **D71** (2005) 004001. (With C. Villavicencio)
59. “Electromagnetic Nucleon Form Factors from QCD Sum Rules”, Journal of High Energy Physics, JHEP03(2005)012 (With H. Castillo and C. A. Dominguez)
60. “Skyrme model and Isospin Chemical Potential”, Physics Letters B. **B632** (2006) 512. (With S. Mendizabal and J. C. Rojas)
61. “Thermal Pions and Isospin Chemical Potential”, Nuclear Physics **B (Proc. Suppl.) 632** (2006) 512.(With C. Villavicencio)
62. “Background Field Method at Finite Temperature and Density”, Physics Letters B. **B635** (2006) 213. (With S. Mendizabal and J. C. Rojas)
63. “Skyrmions, Hadrons and isospin chemical potential”, Physics Letters B. **B638** (2006) 464. (With S. Mendizabal and J. C. Rojas)
64. “ Chemical Potential as a source of stability for gravitating Skyrmions”, Modern Physics Letters **A 22** (2007) 3003. (With S. Mendizabal y J. C. Rojas)
65. “ Hadrons as Skyrmions in the presence of isospin chemical potential”, Nuclear Physics **B (Proc. Suppl.) 174** (2007) 217 (With S. Mendizabal and J. C. Rojas)
66. “ Gauge dependence ambiguity and chemical potential in thermal U(1) theory”, Modern Physics Letters **A 22** (2007) 2763. (With S. Mendizabal and R. A. Santos)
67. “A New Determination of the Electromagnetic Nucleon Form Factors from QCD Sum Rules”, Nuclear Physics **B (Proc. Suppl.) 164** (2007) 260 (With C. A. Dominguez and H. Castillo)

68. “Isospin Chemical Potential and Temperature Effects in the Linear Sigma Model”, hep-ph/0701100, (With M. L. El-Sheikh)
69. “Pion form factor in the Kroll-Lee-Zumino model”, Physical Review **D 76** (2007) 095002. (With C. A. Dominguez, J. I. Jottar and B. Willers)
70. “Heavy-light Quark Pseudoscalar and Vector Mesons at Finite Temperature”, Journal of High Energy Physics **JHEP 08** (2007)040. (With C. A. Dominguez and J. C. Rojas)
71. “Pions in Isospin Dense Matter”, Brazilian Journal of Physics, **Vol. 37** (2007) 520. (With C. Villavivencio)
72. “Thermal Corrections to the  $\pi$ - $\pi$  Scattering Lengths in the Linear Sigma Model”, Physical Review **D 77** (2008) 105006 (With Cristian Martínez V.)Erratum: Physical Review D 78 (2008) 069902(E)
73. “Thermal Behavior of  $\pi - \pi$  scattering lengths in the Nambu-Jona-Lasinio Model”, Physical Review **D 78** (2008) 096007 (With Jorge Ruiz A. and J. C. Rojas)
74. “Scalar radius of the Pion in the Kroll-Lee-Zumino Renormalizable Theory”, Physical Review **D 78** (2008) 057901 (With C. A. Dominguez and B. Willers)
75. “Induced Electromagnetic Fields in Non-Linear QED”, hep-ph 0808.2897, Modern Physics Letters **A 24** (2009) 1857 (With C. A. Dominguez, H. Falomir, M. Ipinza and J. C. Rojas)
76. “Thermal Properties of Heavy-Light Quark Pseudoscalar and Vector Mesons”, Brazilian Journal of Physics **38** (2008) 437. (With C. A. Dominguez and J. C. Rojas)
77. “Considerations about Gribov ambiguities for the abelian Higgs model in the presence of chemical potential and temperature”, hep-ph 0964.3364. (With R. Benguria and R. A. Santos).
78. “Electromagnetic and scalar pion form factor in the Kroll-Lee-Zumino model”, Nuclear Physics **B (Proc. Suppl.) 186** (2009) 141 (With C. A. Dominguez, J. I. Jottar and B. Willers)
79. “QED Vacuum Fluctuations and Induced Electric Dipole Moment of the



- Neutron”, Physical Review **D 80** (2009) 033008 (With C. A. Dominguez, H. Falomir, M. Ipinza, S. Kohler and J. C. Rojas)
80. “ Charmonium in the Vector Channel at Finite Temperature from QCD Sum Rules”, Physical Review **D 81**, (2010) 014007 (With C. A. Dominguez, J. C. Rojas and Yinwen Zhang)
81. “Feynman Diagram and Combination of the Integration by Parts (IBP) and the Integration by Fractional Expansion Techniques”, Physical Review **D 81** (2010) 026003 (With I. González)
82. “Modified Contour-Improved Perturbation Theory”, hep-ph 1005.4444, Physical Review **D 82** (2010) 093007(With G. Cvetic, C. Martínez and C. Valenzuela)
83. “ The Kroll-Lee-Zumino model and pion form factors”. C.A. Dominguez, (Cape Town U.) , M. Loewe, (Chile U., Catolica) . 2010. 4pp. Published in AIP Conf.Proc.1265 VIII Latin American Symposium on Nuclear Physics and Applications:256-259,2010.
84. “QCD sum rules and thermal properties of Charmonium en the vector channel” Nuclear Physics **B (Proc. Suppl.) 207-208** (2009) 273 (With C. A. Dominguez, J. C. Rojas and Y. Zhang)
85. “A modification of Contour-Improved perturbation theory” Nuclear Physics **B (Proc. Suppl.) 207-208** (2010) 152-155 (on G. Cvetic, C. Martínez and C. Valenzuela)
86. “(Pseudo) Scalar Charmonium in Finite Temperature QCD”. Physical Review **D 83** (2011) 034033 (With C. A. Dominguez, J. C. Rojas and Yinwen Zhang)
87. “Thermal nonlocal Nambu-Jona-Lasinio model in the Real Time Formalism” Physical Review **D. 83** (2011) 096005 (With P. Morales and C. Villavicencio)
88. “QCD phase diagram from finite energy sum rules”, hep-ph 1106.5155, Physical Review **D 84** (2011) 056004. (With A. Ayala, A. Bashir, C. A. Dominguez, E. Gutierrez and A. Raya)
89. “Observability of an Induced Electric Dipole of the Neutron form Non-linear QED”. Physical Review **D 85** (2012) 013004 (With O. Zimmer, C. A.

Dominguez and H. Falomir)

90. “Pion stability in a hot dense media”, hep-ph 1107.3859, submitted to Physical Review D. (With C. Villavicencio)
91. “Graphene and non-Abelian quantization”, math-ph 1109.6666, Journal of Physics **A (Mathematical and Theoretical)** **45** (2012) 135308. (With H. Falomir, J. Gamboa and M. Nieto)
92. “Spin Non-commutativity in the Three-Dimensional Oscillator”, hep-th 1111.0511, Physical Review **D** **85** (2012) 025009. (With H. Falomir, J. Gamboa, F. Méndez and J. C. Rojas)
93. “Chiral symmetry restoration and deconfinement in QCD at finite temperature”, hep-ph 1205.3361, Physical Review **D** **86** (2012) 034030 (With A. A. Dominguez and Y. Zhang) Erratum in Physical Review **D** **90** (2014) 039903.
94. “Magnetic Catalysis of a Charged Bose-Einstein Condensate”. hep-ph 1208.0390, Physical Review **D** **86** (2012) 076006. (With A. Ayala, J. C. Rojas and C. Villavicencio)
95. “Noncommutativity in  $(2 + 1)$ -dimensions and the Lorentz group”, hep-ph 1208.6315, Physical Review **D** **86** (2012) 105035. (With H. Falomir, F. Vega, J. Gamboa and F. Méndez)
96. “The cylindrical  $\delta$ -potential and the Dirac equation”, hep-ph 1112.6402, Journal of Physics **A: Mathematical and Theoretical** **45** (2012) 465303. (With C. F. Marquez and R. Zamora)
97. “Rho-meson broadening in QCD at finite temperature”, hep-ph 1210.2588, Physical Review **D** **86** (2012) 114036 ( With A. Ayala, C. A. Dominguez and Z. Yang)
98. “The  $a_1(1260)$  meson and chiral symmetry restoration and deconfinement at finite temperature QCD”, hep-ph 1212.2241, Nuclear Physics **B (Proc. Suppl.)** **234** (2013) 305. Contribución a QCD-2012, Montpellier, Francia (With C. A. Dominguez and Y. Zhang)
99. “Particle-antiparticle asymmetry from magnetogenesis through the Landau mechanism”, hep-ph 1212.4005, Physics Letters **B** **718** (2013) 1548 (With D. Cárcamo, A. Das and J. Gamboa)

100. “Bottonium in QCD at finite temperature”, hep-ph 1307.5766. Physical Review **D 88** (2013) 054015 (With C. A. Dominguez and Y. Zhang)
101. “The nNJL model with a fractional Lorentzian regulator in the real time formalism”, hep-ph 13076764. Physical Review **D 88** (2013) 056004 (With F. Marquez and C. Villavicencio)
102. “Dimuon production from in-medium rho decays from QCD sum rules”, hep-ph 1309.4135. Physical Review **D 88** (2013) 114028 (With A. Ayala, C. A. Dominguez, L. Hernández and A. J. Mizher)
103. “Vacuum instability by a chromoelectric field in 2+1 dimensions”, hep-ph 1310.2875. Physical Review **D 89** (2014) 014019 (With C. F Marquez and R. Zamora)
104. “The Linear Sigma Model and the formation of a charged pion condensate in the presence of an external magnetic field”, hep-ph 1310.5789. Physical Review **D 89** (2014) 016004 (With C. Villavicencio and R. Zamora)
105. “Scalar form factor of the pion in the Kroll-Lee-Zumino field theory”, hep-ph 1403.2204. Advances in High Energy Physics, Vol. 2015, Article ID 803232, 4 pages, 2015. doi:10.1155/2015/803232.(With C. A. Dominguez and M. Luhozi)
106. “Weinberg sum rules at finite temperature”, hep-ph 1405.2228. Physical Review **D 90** (2014) 034012 (With A. Ayala, C. A. Dominguez and Y. Zhang)
107. “Inverse magnetic catalysis for the chiral transition induced by thermomagnetic effects on the coupling constant”, hep-ph 1406.3885. Physical Review **D 90** (2014) 036001 (With A. Ayala, A.J. Mizher and R. Zamora)
108. “Inverse magnetic catalysis in the linear sigma model with quarks”, hep-ph 1406.7408. Physical Review **D 91** (2015) 016002 (With A. Ayala and R. Zamora)
109. “Thermodynamic instabilities in nonlocal NJL models”, hep-ph 1409.0500. To appear in Nuclear Physics B, Proceedings Supplements. Contribution to QCD 2014, Montpellier, France, 2014. (With F. Marquez and C. Villavicencio)
110. “On the magnetic catalysis and inverse catalysis of phase transitions in the linear sigma model”, hep-ph 1409.1517. To appear in Nuclear Physics B, Proceedings Supplements. Contribution to QCD-2014, Montpellier, France, 2014.

(With A. Ayala, C. Villavicencio and R. Zamora)

111. “Graphene transparency in weak magnetic fields”, arXiv: 1410.5501 [cond-mat.mes-hall]. *J. Phys. A: Math. and Theor.* **48** (2015) 065402. (With David Valenzuela, Saúl Hernández-Ortiz and A.Raya)

112. “Finite temperature quark-gluon vertex with a magnetic field in the Hard Thermal Loop approximation”, arXiv: 1410.6388 [hep-ph]. *Physical Review D* **91** (2015) 016007. (With Alejandro Ayala, J. J. Cobos-Martínez, María Elena Tejeda-Yeomans and R. Zamora)

113. “Weak magnetic field effects on chiral critical temperature in a nonlocal Nambu-Jona-Lasinio model”, arXiv: 1410.7266 [hep-ph]. *International Journal of Modern Physics A* **30** (2015) 1550123. (With F. Marquez, C. Villavicencio y R. Zamora)

114. “Quark deconfinement and gluon condensation in a weak magnetic field from QCD sum rules”, arXiv: 1504.01308 [hep-ph]. *Physical Review D* **92** (2015) 016006. (With Alejandro Ayala, C. A. Dominguez, L. A. Hernandez, J. C. Rojas and C. Villavicencio)

115. “On the algebraic structure of rotationally invariant two-dimensional Hamiltonians on the noncommutative phase space”, arXiv:1507.06932 [math-ph]. *J. Phys. A: Mathematical and Theoretical* **A 49** (2016) 055202 (With H. Falomir, P. A. Pisani, F. Vega, D. Carcamo and F. Mendez)

116. “Thermo-magnetic behavior of the quark-gluon vertex”, arXiv: 1509.01610v1 [hep-ph]. Contribución a la 18th International Conference in Quantum Chromodynamics (QCD 15, 30th anniversary), 29 June-2 July 2015, Montpellier, France. To appear in the proceedings. (Nuclear and Particle Physics Proceedings, Elsevier). (With A. Ayala, J. J. Cobos-Martínez, M. E. Tejeda-Yeomans y R. Zamora)

117 “The magnetized effective QCD phase diagram”, arXiv: 1509.03345v2 [hep-ph], submitted to *Phys. Rev.D*. (With a. Ayala, C. A. Dominguez, L. A. Hernandez y R. Zamora)

118. “Inverse magnetic catalysis from the properties of the QCD coupling in a magnetic field”, arXiv 1510.09134 [hep-ph]. *Physics Letters* **B759** (2016) 99 (With A. Ayala, C. A. Dominguez, L. A. Hernandez, and R. Zamora)

119. “Thermo-magnetic properties of the strong coupling in the local Nambu-

Jona-Lasinio model”, arXiv 1602.00833 [hep-ph], Physical Review **D 94**(2016) no.5, 054019 (With A. Ayala, C. A. Dominguez, L. A. Hernandez, A. Raya, J. C. Rojas and C. Villavicencio)

120. “Finite temperature effects and the validity of the Weinberg sum rules”, Journal of Physics: Conference Series **720** (2016) 012024. Contribución al *XIX<sup>th</sup>* Simposio Chileno de Física, Concepción, Chile. (With A. Ayala, C. A Dominguez y Y. Zhang)

121. “Inverse magnetic catalysis in the linear sigma model”, Journal of Physics: Conference Series **720** (2016) 012026. Contribución al *XIX<sup>th</sup>* Simposio Chileno de Física, Concepción, Chile. (With A. Ayala y R. Zamora)

122. “Atomic Collapse in Graphene: Lost of Unitarity”, arXiv [math-ph] 1608.0503, J. Phys. A: Math. and Theor. **49** (2016) 495302 (With D, Valenzuela, S. Hernández-Ortiz and A. Raya)

123. “Finite inite temperature QCD Sum Rules: A review”, arXiv 1608.04284 [hep-ph], Advances in High Energy Physics 2017 (2017) 9291623 (With Alejandro Ayala and C. A. Dominguez)

124. “Comparison between the continuum threshold and the Polyakov loop as deconfinement order parameters”, arXiv [hep-ph] 1610.05429. Physical Review **D95**(2017) no.3, 036003 . (With J. P. Carlomagno)

125. “Metastable Pions in Dense Media”, arXiv 1610.0575 [hep-ph], Physical Review **D 95**(2017) 096013. (With A. Raya and C. Villavicencio)

126. “Thermomagnetic correlation lengths of strongly interacting matter in the Nambu-Jona-Lasinio model”, arXiv 1706.04956. Physical Review **D96**(2017) 034007. (With Alejandro Ayala, L. A. Hernndez, A. Raya, J. C. Rojas and R. Zamora)

127. “The continuum threshold and the Polyakov loop: A comparison between two deconfinement order parameters ”. arXiv:1709.01505 [hep-ph] —.To appear in the Proceedings of QCD-2017, Montpellier, Francia. (With J. P. Carlomagno)

128. “Optical transparency in an effective model for Graphene”, arXiv [cond-mat.str-el] 1712.10303, Physical Review **B 98** (2018) 195430 (With H. Falomir, E. Muñoz and A. Raya)

129. “Magnetic corrections to  $\pi$ - $\pi$  scattering lengths in the linear sigma model”

arXiv [hep-ph] 1712.10047, Physical Review **D97** (2018) 056023 (With L. Monje and R. Zamora)

130. “Gluon polarization tensor in a thermo-magnetic medium”, arXiv [hep-ph] 1805.07344, submitted to European Journal of Physics C. (With Alejandro Ayala, C.A. Dominguez, S. Hernandez-Ortiz, L.A. Hernandez, D. Manreza Paret, R. Zamora).

131. “Bridging the two order parameters for the QCD deconfinement phase transition” EPJ Web of Conferences 172, 04005 (2018) ISMD 2017. (With J. P. Carlomagno)

132. “Thermo-magnetic evolution of the QCD strong coupling”, arXiv [hep-ph] 1805.08198, Physical Review (Rapid Communications) **D98** (2018) 031501 (With Alejandro Ayala, C.A. Dominguez, Saul Hernandez-Ortiz, L.A. Hernandez, D. Manreza Paret, R. Zamora).

133. “QCD determination of the magnetic field dependence of QCD and hadronic parameters”, arXiv [hep-ph] 1806.10088, Physical Review **D98** (2018) 034015 (With C. A. Dominguez and Cristian Villavicencio)

134. “Superstatistics and the effective QCD phase diagram”, arXiv [hep-ph] 1809.04728, Physical Review **D98** (2018) 114002. (With A. Ayala, M. Hentschinski, L. A. Hernandez and R. Zamora)

135. “A new perspective for the magnetic corrections to  $\pi$ - $\pi$  scattering lengths in the linear sigma model”, arXiv [hep-ph] 1901.03256, Physical Review **D99** (2019) 056002 (With L. Monje, E. Muñoz, A. Raya and R. Zamora)

136. “Magnetic renormalons in a scalar self interacting  $\lambda\phi^4$  theory”, arXiv [hep-ph] 1901.06426. Physical Review **D99** (2019) 096024. (With M. Correa, D. Valenzuela y R. Zamora)

137. “Pinning down the QCD critical end point”, arXiv [hep-ph] 1904.11905. Submitted to Physical Review Letters. (With Alejandro Ayala, Luis A. Hernandez, Marcelo Loewe, J.C. Rojas y Renato Zamora).

138. “To grow or not to grow. Thermomagnetic behavior of the strong coupling”, Published in EPJ Web Conf. 206 (2019) 02001, DOI: 10.1051/epj-conf/201920602001. Conference: C18-09-03.1 Proceedings. With Alejandro Ayala (Mexico U., ICN Cape Town U.), C.A. Dominguez (Cape Town U.), Saul Hernandez-Ortiz (Mexico U., ICN), L.A. Hernandez (Mexico U., ICN Cape

Town U.), M. Loewe (Chile U., Catolica Cape Town U. CCTVal, Valparaiso), D.Manreza Paret (Mexico U., ICN Havana U.), R. Zamora (Diego Portales U. Chile U., Santiago).

139. “Thermo-magnetic corrections to  $\pi$ - $\pi$  scattering lengths in the linear sigma model”, arXiv [hep-ph] 1905.03783. Submitted to Physical Review D. (With E. Muñoz y R. Zamora).

140. “Optical Conductivity in an effective model for Graphene: Finite temperature corrections”, arXiv: 1907.02017[cond-mat.mes-hall]. Submitted to Physical Reeviw B. (With H. Falomir, E. Muñoz and R. Zamora).

141. “Relation between the continuum threshold and the Polyakov loop with the QCD deconfinement transition”, arXiv 1906.05692 [hep-ph]. Physical Review **D100** (2019) 076022. (With J. P. Carlomagno).

#### Local Publications:

1. “The Small-x Limit of Deep Inelastic Scattering”, Proceedings of the 3rd Simposio Chileno de Física, Valparaíso, (December 1982).

2. “The Quantum Limit of Strong-Coupling-Large N QCD”, Proceedings of the 4th Simposio Chileno de Física, Santiago, (December 1984). (With N. Bralić)

3. “Chiral and Flavor Symmetry Breaking in Quantum Chromodynamics”, Proceedings of the 4th Simposio Chileno de Física, Santiago, (December 1984). (With C. A. Domínguez)

4. “Determinación de Condensados en Cromodinámica Cuántica”, Proceedings of the 5th Simposio Chileno de Física, Santiago, (December 1986). (With R. A. Bertlmann, C. A. Domínguez, M. Perrottet and E. de Rafael)

5. “Efecto de la Quinta Fuerza sobre Estrellas de Gran Densidad”, Proceedings of the 5th Simposio Chileno de Física, Santiago, (December 1986). (With J. Alfaro)

6. “The Triangle Diagram at Finite Temperature”, Encuentro Latinoamericano de Física de Alta Energía. Valparaíso (December 1987). Published in Scien-

tia 165-166, Pág. 387. (N. Bralić, M. Loewe y I. Schmidt eds.). (With C. Contreras)

7. “Efectos Supercríticos y el Potencial  $\delta$  de Dirac”, Proceedings of the 6th Simposio Chileno de Física, Santiago, (December 1988). (With M. Sanhueza)

8. “La Anomalía U(1) a Temperatura Finita”, Proceedings of the 6th Simposio Chileno de Física, Santiago, (December 1988). (With C. Contreras)

9. “Producción de Pares de Muones en Colisiones relativistas de Iones Pesados”, Proceedings of the 7th Simposio Chileno de Física, Santiago, (December 1990). (With C. A. Domínguez)

10. “Hots Spots en el Protón”, Proceedings of the 8th Simposio Chileno de Física, Valparaíso, (December 1992). (With J. Bartels and A. De Roeck)

11. “Modelos Híbridos y Deconfinamiento a Temperatura Finita”, Proceedings of the 8th Simposio Chileno de Física, Valparaíso, (December 1992). (With H. Falomir y J. C. Rojas)

12. “Efectos Térmicos y la Acción Efectiva de la Electrodinámica Cuántica”, Proceedings of the 8th Simposio Chileno de Física, Valparaíso, (December 1992). (With J. C. Rojas)

13. “Física Hadrónica a Temperatura Finita”, Invited Talk, Proceedings of the 9th Simposio Chileno de Física, Temuco, (November 1994).

14. “Piones térmicos y Reglas de Suma de QCD”, Proceedings of the 10th Simposio Chileno de Física, Valparaíso, (November 1996). (With C. A. Domínguez y M. Fetea)

15. “Comportamiento Térmico de la Constante de Acoplamiento Axial del Nucleón”, Proceedings of the 11th Simposio Chileno de Física, Santiago, December 1998.

16. “The Dirac equation with a  $\delta$  potential”, Proceedings of the 12th Simposio Chileno de Física, Santiago, November 2000. Revista Mexicana de Física, Vol. 48, Supl. 3 (2002) 106. (With R. Benguria and H. Castillo)



17. “Thermal Pions at Finite Isospin Density”, Proceedings of the 13th Simposio Chileno de Física, Concepción, November 2002. (With C. Villavicencio)
18. “Modelo de Weinberg-Salam con Potencial Químico”, Proceedings of the XIV Simposio Chileno de Física, Antofagasta, Noviembre 2004 (With S. Mendizabal)
19. “Masses and Condensates Behavior in the Condensed Pion Phase”, Proceedings of the XIV Simposio Chileno de Física, Antofagasta, Noviembre 2004 (With C. Villavicencio)
20. “Materia bajo condiciones extremas” en “Dialogando con Einstein”, María Benitez, Beatriz Cancino, Bernd Fichtner, Ricardo Loeb, Marcelo Loewe, Falk Seeger y Horst Nitschack Instituto Goethe, Santiago, (Ed) Lom, Julio 2008.
21. “Historia de un gran descubrimiento: El bosón de Higgs en el LHC. Señales experimentales sobre su existencia y posibles efectos tecnológicos inseperados” Revista Chilena de Ingeniería, Vol. 125, Nro. 1-ISSN 0716-2340, Abril 2013.

## Grants (Research Proposals)

- Responsible Researcher of the proposals DIUC 205/83, 18/85, 046/87
- Responsible Researcher of the FONDECYT proposals 1032/85, 367/88, 367/90, 751/92, 1950797, 1980577, 1010976, 1051067, 1095217, 1130056, 1170107. I have been responsible researcher of Fondecyt grants for about 20 years
- Coresearcher in other proposals DIUC, FONDECYT and UNESCO
- Responsible researcher for the coordination of the “Proyecto Fundación Andes de Cooperación Científica” between Santiago (Chile)-La Plata (Argentina) and Rio de Janeiro (Brasil)”, 1991-1992, under contract C-11626
- Responsible researcher for the coordination of the “Proyecto Fundación Andes de Cooperación Científica” between Santiago (Chile)-La Plata (Argentina) y Rio de Janeiro (Brasil)”, 1993-1994, under contract C-12345/9
- Responsible resarcher for the coordination of the “Proyecto Fundación Andes de Cooperación Científica” between Santiago (Chile) y La Plata (Argentina), 1995-1997, under contract C-12777/9

- Responsible researcher for the coordination of the “ Proyecto Fundación Andes de Cooperación Científica” between Santiago (Chile), La Plata (Argentina) and Rio de Janeiro 1998-1999, under contract C-13398/6

## Stays as a visiting Scientist

- Centre de Physique Théorique II, Marseille, France, January-March 1985
- Theory Group, DESY (Deutsches Elektronen Synchrotron), Hamburg, Germany, January-March 1986, August 1988.
- Physics Department, University of Cape Town (South Africa): April 1989, August 1990, August 1991, August 1992, October 1996, March 1998, November 2006, November 2007, January 2011, September 2011, October 2013
- National Institute for Theoretical Physics, Wallenberg Centre Stellenbosch, NITheP, (South Africa) September 2009
- II. Institut for Theoretical Physics, Hamburg University, Germany, June-July 1991; June 2003
- Departamento de Física de la Universidad Nacional de La Plata, Argentina: May 1992, November 1992, May 1994, April 1996, November 1997, March 2000, December 2002, December 2005, August 2007, September 2010, July 2011, June-July 2016
- Physics Department, Johannes Gutenberg University (Mainz), Germany, August 1993
- Physics Department, RWTH Aachen, Germany, July 2000
- Departamento de Física Teórica, Universidad de Zaragoza, Spain, May and November 2003
- Departamento de Física, Universidad de Barcelona, Spain, July 2005
- Departamento de Física, Comisión Nacional de Energía Atómica, Buenos Aires, Argentina, July 2009
- Instituto de Ciencias Nucleares, Universidad nacional Autónoma de Mexico, April 2013, November 2016, July 2018
- Georgia Institute of Technology, Physics Department, USA, April 2013

- Department of Physics and Engineering Physics, University of Saskatchewan, Saskatoon, Canada, September 2013. External examiner of the Ph.D thesis by R. Kleiv
- Department of Physics, Ben Gurion University, Beersheva, Israel, July 2014, July 2015, July 2017
- Departamento de Física, Universidad Michoacana de San Nicolás de Hidalgo, Morelia, México, July 2018

## Seminars and Talks

- Santiago de Chile: Seminars at the Facultad de Física, Pontificia Universidad Católica de Chile; Facultad de Ciencias Físicas y Matemáticas, Universidad de Chile; Facultad de Ciencias, Universidad de Chile; Departamento de Física, Universidad de Santiago
- Valparaíso, Departamento de Física, Universidad Técnica Federico Santa María
- Marseille, France, CNRS, Centre de Physique Théorique II
- Trieste, Italia, ICTP
- Villigen, Suiza, SIN, Institut Paul Scherer
- La Plata, Argentina, Departamento de Física, Universidad Nacional de La Plata
- Cape Town, South Africa, Physics Department, University of Cape Town
- Hamburg, Germany, Deutsches Elektronen Synchrotron, DESY, Theory Group
- Stellenbosch, South Africa, Physics Department, University of Stellenbosch
- Mainz, Germany, Physics Department, Universität Johannes Gutenberg
- Toronto, Canada, Physics Department, University of Toronto
- Aachen, Germany, Physics Department, RWTH
- Heidelberg, Germany, Physics Department, Universität Heidelberg
- Zaragoza, Spain, Departamento de Física Teórica, Universidad de Zaragoza

- Departamento de Física, Comisión Nacional de Energía Atómica, Buenos Aires, Argentina
- Ciudad de México, México, Instituto de Ciencias Nucleares, Universidad Autónoma de Mexico
- Atlanta, USA, Georgia Institute of Technology, Physics Department
- Saskatoon, Canada, Department of Physics and Engineering Physics, University of Saskatchewan
- Beersheva, Israel, Department of Physics, Ben Gurion University

## Administration

- Secretario Académico (Academic Secretary) of the Facultad de Física, Pontificia Universidad Católica de Chile. Since March 1992 until March 2003.
- Director de Investigación y Postgrado (Director of research and graduate program) of the Facultad de Física, Pontificia Universidad Católica de Chile. Since March 2003 until March 2010
- Head of the Physics Department, Facultad de Física, Pontificia Universidad Católica de Chile, between March 2010 and March 2014.
- Profesor Representativo, Honorable Consejo Superior, Pontificia Universidad Católica de Chile. Since March 2017.

## Other Aspects

- Referee for the following Journals: Physical Review D; Physics Letters A; International Journal of Physics A: Mathematical and General; Nuclear Physics A; European Physical Journal A; Canadian Journal of Physics.
- Member of the Chilean Physical Society (Sochifi). Member of the American Physical Society.
- Member of the Directory of the Chilean Physical Society (SOCHIFI) between 1989 and 1993. Between 1991 and 1993, treasurer of the Society and delegate of SOCHIFI to the ICSU committee.
- Foreign Member, Centre for Theoretical Physics & Astrophysics, University of Cape Town, South Africa (since 2005).

- Member, International Advisory Committee, Centre for Theoretical Physics & Astrophysics, University of Cape Town, South Africa (since 2006).
- Member of the Fondecyt Committee that analyzes the research proposals in physics. /1999-2001. Chairman during 2001. Member of the Fondecyt Committee for projects in Astrophysics and High Energy Physics 2016-2017
- Several Chamber Music Concerts along the country, as violist in different ensembles (Trios, Quartets, etc.)

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