

# Alberto M. Gago

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Pontificia Universidad Catolica del Peru, Apartado 1761, Lima, Peru*

## Education

**Doctor in Sciences**, 2001, Physics, Universidade de Sao Paulo, Sao Paulo, Brazil

**Master in Physics**, 1995, Physics, Pontificia Universidad Catolica del Peru, Lima, Peru

**Bachelor of Science**, 1992, Physics, Pontificia Universidad Catolica del Peru, Lima, Peru

## Research Positions

**California State University at Dominguez Hills**, 2002, Research Physicist

**Universidade de Sao Paulo**, 2001, Postdoc position

## Academic Positions

**Pontificia Universidad Catolica del Peru (PUCP)**,

Full Professor : 2009-Present

Associate Professor: 2003-2008

Assistant Professor: 1995-2002

Lecturer: 1992-1995

**Universidad Peruana de Ciencias Aplicadas**,

Lecturer: 1996

## Prizes and Fellowships

**TWAS (Third Academy of Science)** Prize for Young Scientist in Developing Countries awarded at 2005 – Physics

**NSF (National Science Foundation)** Postdoctoral Scholarship

**FAPESP (Fundação da amparo à pesquisa de São Paulo- Brasil)** Postdoctoral Scholarship

**FAPESP (Fundação da amparo à pesquisa de São Paulo)** Scholarship to support the doctoral studies

**FERMILAB & CINVESTAV (Mexico)** Scholarship to support my work in my master's thesis at Fermilab ( E-791 experiment)

## **Supervision of graduate students**

### **Master Students:**

Joel Jones- master's thesis awarded with the Research Prize at PUCP (2005)

Jose Bazo- master's thesis awarded with the Research Prize at PUCP (2006)

Leonidas Aliaga- master's thesis awarded with the Research Prize at PUCP (2008)

Carmen Araujo – master's dissertation 2009

Ydalia Delgado – master's dissertation 2009

Carlos Pérez – master's dissertation 2010

Mauricio Bustamante –master's dissertation 2010

## **Grants**

### **Direccion Academica de la Investigacion-PUCP:**

Research grant - \$ 4320 (2003)

Research grant - \$ 6480 (2004)

Research grant - \$ 9960 (2005)

Research grant - \$ 7200 (2006)

Research grant - \$ 9900 (2007)

Research grant - \$ 9900 (2008)

Research grant - \$ 10000 (2009)

Research grant - \$ 10000 (2010)

### **Helen (High Energy Physics Latinamerican Network) Project:**

Research grants \$120000 (2006-2008). Grant shared with the Universidad Peruana Cayetano Heredia.

- Member of the executive board .

## **Participation in experimental collaborations**

Former member of SuperKamiokande Collaboration

Current member of MINERvA and ALICE Collaboration (leader of the PUCP group)

## **Membership in Organizations**

Member of the National Academy of Sciences – Perú.

## Physics Publications in Refereed Journals

- [1] K. Aamodt *et al.*, PRODUCTION OF PIONS, KAONS AND PROTONS IN PP COLLISIONS AT  $\sqrt{s}=900$  GEV WITH ALICE AT THE LHC. In Eur.Phys.J.C 71(6): 1655, 2011.
- [2] K. Aamodt *et al.*, HIGHER HARMONIC ANISOTROPIC FLOW MEASUREMENTS OF CHARGED PARTICLES IN PB-PB COLLISIONS AT 2.76 TEV. In Phys. Rev. Lett. 107, 032301 (2011).
- [3] K. Aamodt *et al.*, RAPIDITY AND TRANSVERSE MOMENTUM DEPENDENCE OF INCLUSIVE J/PSI PRODUCTION IN PP COLLISIONS AT  $\sqrt{s}=7$  TEV. In Phys.Lett. B704 (2011) 442-455.
- [4] M.Bustamante, A. M. Gago, J. Jones, SUSY RENORMALIZATION GROUP EFFECTS IN ULTRA HIGH ENERGY NEUTRINOS. In JHEP 1105 (2011) 133.
- [5] K. Aamodt *et al.*, TWO-PION BOSE-EINSTEIN CORRELATIONS IN CENTRAL PB-PB COLLISIONS AT  $\sqrt{s_{NN}} = 2.76$  TEV. In Phys.Lett.B696:328-337,2011.
- [6] K. Aamodt *et al.*, STRANGE PARTICLE PRODUCTION IN PROTON-PROTON COLLISIONS AT  $\sqrt{s} = 0.9$  TEV WITH ALICE AT THE LHC. In Eur.Phys.J.C71:1594,2011.
- [7] K. Aamodt *et al.*, CENTRALITY DEPENDENCE OF THE CHARGED-PARTICLE MULTIPLICITY DENSITY AT MID-RAPIDITY IN PB-PB COLLISIONS AT  $\sqrt{s_{NN}} = 2.76$  TEV. In Phys.Rev.Lett.106:032301,2011.
- [8] K. Aamodt *et al.*, SUPPRESSION OF CHARGED PARTICLE PRODUCTION AT LARGE TRANSVERSE MOMENTUM IN CENTRAL PB-PB COLLISIONS AT  $\sqrt{s_{NN}} = 2.76$  TEV. In Phys.Lett.B696:30-39,2011.
- [9] K. Aamodt *et al.*, CHARGED-PARTICLE MULTIPLICITY DENSITY AT MID-RAPIDITY IN CENTRAL PB-PB COLLISIONS AT  $\sqrt{s_{NN}} = 2.76$  TEV. In Phys.Rev.Lett.105:252301,2010.
- [10] C. A. Argüelles, M. Bustamante and A.M. Gago, ICECUBE EXPECTATIONS FOR TWO HIGH-ENERGY NEUTRINO PRODUCTION MODELS AT ACTIVE GALACTIC NUCLEI. In JCAP 1012:005,2010.
- [11] K. Aamodt *et al.*, TRANSVERSE MOMENTUM SPECTRA OF CHARGED PARTICLES IN PROTON-PROTON COLLISIONS AT  $\sqrt{s} = 900$  GEV WITH ALICE AT THE LHC. In Phys.Lett.B693:53-68, 2010.

- [12] K. Aamodt *et al.*, TWO-PION BOSE-EINSTEIN CORRELATIONS IN PP COLLISIONS AT  $\sqrt{s}=900$  GEV. In Phys.Rev.D82:052001,2010.
- [13] K. Aamodt *et al.*, MIDRAPIDITY ANTIPROTON-TO-PROTON RATIO IN PP COLLISIONS AT  $\sqrt{s} = 0.9$  AND  $\sqrt{s} \sim 7$  TEV MEASURED BY THE ALICE EXPERIMENT. In Phys.Rev.Lett.105:072002,2010.
- [14] K. Aamodt *et al.*, CHARGED-PARTICLE MULTIPLICITY MEASUREMENT IN PROTON-PROTON COLLISIONS AT  $\sqrt{s} = 7$  TEV WITH ALICE AT LHC. In Eur.Phys.J.C68:345-354,2010.
- [15] K. Aamodt *et al.*, CHARGED-PARTICLE MULTIPLICITY MEASUREMENT IN PROTON-PROTON COLLISIONS AT  $\sqrt{s} = 0.9$  AND 2.36 TEV WITH ALICE AT LHC. In Eur.Phys.J.C68:89-108,2010.
- [16] M. Bustamante, A. M. Gago and Carlos Peña-Garay, ENERGY-INDEPENDENT NEW PHYSICS IN THE FLAVOUR RATIOS OF HIGH-ENERGY ASTROPHYSICAL NEUTRINOS. In JHEP 1004:066,2010.
- [17] K. Aamodt *et al.*, ALIGNMENT OF THE ALICE INNER TRACKING SYSTEM WITH COSMIC-RAY TRACKS. In JINST 5:P03003,2010.
- [18] K. Aamodt *et al.*, FIRST PROTON-PROTON COLLISIONS AT THE LHC AS OBSERVED WITH THE ALICE DETECTOR: MEASUREMENT OF THE CHARGED PARTICLE PSEUDORAPIDITY DENSITY AT  $\sqrt{s} = 900$  GEV. In Eur.Phys.J.C65:111-125,2010.
- [19] J.L. Bazo, M. Bustamante, A.M. Gago and O. Miranda, HIGH ENERGY ASTROPHYSICAL NEUTRINO FLUX AND MODIFIED DISPERSION RELATIONS. In Int.J.Mod.Phys.A24:5819-5829,2009.
- [20] A. M. Gago, H. Minakata, H. Nunokawa, S. Uchinami, and R. Zukanovich Funchal, RESOLVING CP VIOLATION BY STANDARD AND NONSTANDARD INTERACTIONS AND PARAMETER DEGENERACY IN NEUTRINO OSCILLATIONS. In JHEP 1001:049,2010.
- [21] K. Aamodt *et al.*, THE ALICE EXPERIMENT AT CERN LHC. In JINST 0803:S08002, 2008, JINST 3:S08002, Sep 2008.
- [22] P. Cortese *et al.*, ALICE ELECTROMAGNETIC CALORIMETER TECHNICAL DESIGN REPORT. In CERN-LHCC-2008-014, CERN-ALICE-TDR-014, Sep 2008.

- [23] A. M. Gago and J. Jones, REVISING THE SOLUTION OF THE NEUTRINO OSCILLATION PARAMETER DEGENERACIES AT NEUTRINO FACTORIES. In Physical Review D75:033004, 2007.
- [24] M.B. Smy *et al* , PRECISE MEASUREMENT OF THE SOLAR NEUTRINO DAY / NIGHT AND SEASONAL VARIATION IN SUPER-KAMIOKANDE I. In Physical Review D69:011104, 2004.
- [25] J. Yoo *et al*. A SEARCH FOR PERIODIC MODULATIONS OF THE SOLAR NEUTRINO FLUX IN SUPER-KAMIOKANDE I. In Physical Review D68:092002, 2003.
- [26] Y. Gando *et al*. SEARCH FOR ANTI-NU(E) FROM THE SUN AT SUPER-KAMIOKANDE I. In Physical Review Letters .90:171302, 2003.
- [27] M. Malek *et al*. SEARCH FOR SUPERNOVA RELIC NEUTRINOS AT SUPER-KAMIOKANDE. In Physical Review Letters 90:061101, 2003.
- [28] S. Fukuda *et al*. DETERMINATION OF SOLAR NEUTRINO OSCILLATION PARAMETERS USING 1496 DAYS OF SUPER-KAMIOKANDE-I DATA, In Physical Letters B539:179-187, 2002.
- [29] A.M. Gago, M.M. Guzzo, P.C. de Holanda, H. Nunokawa, O.L.G. Peres, V.Pleitez, R.Zukanovich Funchal. GLOBAL ANALYSIS OF THE POST-SNO SOLAR NEUTRINO DATA FOR STANDARD AND NON-STANDARD OSCILLATION MECHANISMS. In Physical Review D64:073003, 2001.
- [30] Vernon D. Barger, A.M. Gago , D. Marfatia, W.J.C. Teves, B.P. Wood , R. Zukanovich Funchal. NEUTRINO OSCILLATION PARAMETERS FROM MINOS, ICARUS AND OPERA COMBINED. In Physical Review D65:053016, 2002.
- [31] A.M. Gago , M.M. Guzzo, H. Nunokawa , W.J.C. Teves, R. Zukanovich Funchal. PROBING FLAVOR CHANGING NEUTRINO INTERACTIONS USING NEUTRINO BEAMS FROM A MUON STORAGE RING. In Physical Review D64:073003, 2001.

- [32] A.M. Gago, E.M. Santos, W.J.C. Teves, R. Zukanovich Funchal. ON THE QUEST FOR THE DYNAMICS OF (MUON)NEUTRINO  $\rightarrow$  (TAU)NEUTRINO CONVERSION. In Physical Review D63:113013, 2001.
- [33] A.M. Gago, E.M. Santos, W.J.C. Teves, R. Zukanovich Funchal. QUANTUM DISSIPATIVE EFFECTS AND NEUTRINOS: CURRENT CONSTRAINTS AND FUTURE PERSPECTIVES. In Physical Review D63:073001, 2001.
- [34] A.M. Gago, H. Nunokawa and R. Zukanovich Funchal. THREE FLAVOR LONG WAVELENGTH VACUUM OSCILLATION SOLUTION TO THE SOLAR NEUTRINO PROBLEM. In Physical Review D 63:013005,2001, Erratum-  
ibid.D64:119902,2001.
- [35] A.M. Gago, H. Nunokawa and R. Zukanovich Funchal. THE SOLAR NEUTRINO PROBLEM AND GRAVITATIONALLY INDUCED LONG WAVELENGTH NEUTRINO OSCILLATION. In Physical Review Letters.84:4035-4038, 2000.
- [36] A. M. Gago, V. Pleitez and R. Zukanovich Funchal. CP VIOLATION IN VACUUM NEUTRINO OSCILLATION EXPERIMENTS. In Physical Review D 61:016004, 2000
- [37] F. de Zela, E. Solano and A. Gago. MICROMASER WITHOUT THE ROTATING-WAVE APPROXIMATION: THE BLOCH-SIEGERT SHIFT AND RELATED EFFECTS. In Optics Communications 142 (1997) 106-118.
- [38] A. Gago and G. Herrera. BOSE-EINSTEIN CORRELATIONS AND MULTIFRAGMENTATION. In RELATIVISTIC HEAVY – ION COLLISIONS. In Revista Mexicana de Física, 41: 30-37 Suppl. 1, Dec. 1995.
- [39] A. Gago and G. Herrera. BOSE-EINSTEIN CORRELATIONS AND THE FRAGMENTATION RADIUS. In Modern Physics Letter A10:1435-1440, 1995.

## Publications on Proceedings

- [1] A. M. Gago, H. Minakata, H. Nunokawa, S. Uchinami, R. Zukanovich Funchal, RESOLVING STANDARD AND NONSTANDARD CP VIOLATION PHASES IN NEUTRINO OSCILLATIONS. Presented at 11th International Workshop on Neutrino Factories, Superbeams and Betabeams: NuFact09, Chicago, Illinois, 20-25 Jul 2009. Published in AIP Conf.Proc.1222:140-144,2010.
- [2] Edith Castillo-Ruiz, A. M. Gago, ESTIMATION OF NU FLUXES FROM THE AUGER DATA. Prepared for 3rd School on Cosmic Rays and Astrophysics (SCRA-08), Arequipa, Peru, 25 Aug - 5 Sep 2008. Published in AIP Conf.Proc.1123:237-239,2009.
- [3] M. Bustamante, A. M. Gago, C. Peña-Garay, EXTREME SCENARIOS OF NEW PHYSICS IN THE UHE ASTROPHYSICAL NEUTRINO FLAVOUR RATIOS. Proceedings of DISCRETE'08: Symposium on Prospects in the Physics of Discrete Symmetries, Valencia, Spain, 11-16 Dec 2008. Published in J.Phys.Conf.Ser.171:012048,2009.
- [4] M. Bustamante, A. M. Gago, J.L. Bazo and O. G. Miranda, ON THE SENSITIVITY OF NEUTRINO TELESCOPES TO A MODIFIED DISPERSION RELATION. Published in AIP Conf.Proc.1026:251-253,2008.
- [5] C. Perez Lara, A. M. Gago, J. Morfin, D. A. Jensen, R. Gran, BEAMLINER DESIGN FOR MINERVA TESTBEAM DETECTOR. Contributed to HCP2008: 19th Hadron Collision Physics Symposium 2008, Galena, Illinois, 27-31 May 2008. e-Print: arXiv:0808.0199.
- [6] C. Perez Lara, A. M. Gago, G. Herrera Corral, OPTICAL SIMULATION FOR V0A. Work presented in the 10th Mexican Workshop on Particles and Fields, Morelia, Michoacan, Mexico, 7-12 Nov 2005. Published in AIP Conf.Proc.857:306-310, 2006.
- [7] J. L. Bazo, A. M. Gago, EXPECTED FLUX OF HIGH ENERGY NEUTRINOS FROM OBSERVE ACTIVE GALACTIC NUCLEI. Work presented at the 5th Latin American Symposium on High Energy Physics (V-SILAFEA), Lima, Peru, 12-17 Jul 2004. Published in \*Lima 2004, High energy physics\* 344-345.
- [8] L. Stucchi, A. M. Gago, V. Gupta, CONSEQUENCES ON THE NEUTRINO MIXING MATRIX FROM TWO ZERO TEXTURES IN THE NEUTRINO MASS MATRIX. . Work presented at the 5th Latin American Symposium on High Energy Physics (V-SILAFEA), Lima, Peru, 12-17 Jul 2004. Published in \*Lima 2004, High energy physics\* 342-343.
- [9] L. Aliaga, A. M. Gago, REVISION OF THE NEUTRINO OSCILLATION PROBABILITY IN THE SUPERNOVAE. Work presented at the 5th Latin American Symposium on High Energy Physics (V-SILAFEA), Lima, Peru, 12-17 Jul 2004. Published in \*Lima 2004, High energy physics\* 340-341.

- [10] J. Jones, A. M. Gago, DEGENERACIES IN THE MEASUREMENT OF NEUTRINO OSCILLATION PARAMETERS: PROBLEM AND SOLUTION IN NEUTRINO FACTORIES. Work presented at the 5th Latin American Symposium on High Energy Physics (V-SILAFAE), Lima, Peru, 12-17 Jul 2004. Published in \*Lima 2004, High energy physics\* 338-339.
- [11] A.M. Gago , M.M. Guzzo, H. Nunokawa , W.J.C. Teves, R. Zukanovich Funchal. FUTURE TEST OF NON-STANDARD NEUTRINO INTERACTIONS. Work presented in the 6th International Workshop on Topics in Astroparticle and Underground Physics (TAUP 2001), LNGS, Italy, 8-12 Sep 2001. Published in Nucl.Phys.Proc.Suppl.110:407-409, 2002.
- [12] R. Zukanovich Funchal, E.M. Santos, W. Teves, A. M. Gago QUANTUM DECOHERENCE AND NEUTRINO OSCILLATIONS. Work presented in the International Europhysics Conference on High Energy Physics (HEP2001), Budapest, Hungary, 12-18 July 2001. Published in \*Budapest 2001, High energy physics\* hep2001/216.
- [13] A.M. Gago, H. Nunokawa, R. Zukanovich Funchal. VIOLATION OF EQUIVALENCE PRINCIPLE AND SOLAR NEUTRINOS. Work presented at Europhysics Neutrino Oscillation Workshop (NOW 2000), Conca Specchiulla, Otranto, Lecce, Ita, 9-16 Sep 2000. Published in Nucl.Phys.Proc.Suppl.100:68-70,2001. Also in Otranto 2000, Europhysics neutrino oscillation workshop\* 68-70 e-Print Archive: hep-ph/0012168.
- [14] A. Gago, H. Nunokawa and R. Zukanovich Funchal. THE SOLAR NEUTRINO PROBLEM IN THE LIGHT OF A VIOLATION OF THE EQUIVALENCE PRINCIPLE. Work presented in the 6th International Workshop on Topics in Astroparticle and Underground Physics (TAUP 99), Paris, France, 6-10 Sep 1999. Published in Nucl.Phys.Proc.Suppl.87: 215-217, 2000.
- [15] A. Gago and R. Zukanovich Funchal. DISCUSSION ON THE PARAMETERIZATION OF THE LEPTON MIXING MATRIX IN MODELS WITH MASSIVE NEUTRINOS. Published in the proceedings of the XVII Brazilian National Meeting on Particles and Fields, Brazil, 1997.
- [16] F. de Zela, E. Solano and A. Gago. MICROMASER EQUATIONS WITHOUT THE ROTATING-WAVE APPROXIMATION: THE NON-RESONANT CASE. Work presented at the Second-Iberoamerican Optics Conference, Guanajuato, Mexico. Published by SPIE Volume 2730. p. 60-65.
- [17] A. Gago and G. Herrera Corral. TWO PARTICLE CORRELATIONS IN HEAVY ION COLLISIONS. In Villahermosa 1994, Particles and fields, Oct 1994. Published by World Scientific Publishing Company. P. 254-263.