

CURRICULUM VITAE

Name: Alejandra Melfo.
Place and Date of Birth: Montevideo, Uruguay, 26/02/65
Nationality: Uruguayan (by birth) and Venezuelan.
Marital Status: Single.
Permanent Address: Facultad de Ciencias ULA, La Hechicera,
Mérida 5101A, **Venezuela**.

Education

- (1993 -1997) International School for Advanced Studies, SISSA-ISAS, Trieste, Italy
Ph. D. in Astrophysics
- (1992- 1993) International Centre for Theoretical Physics, Trieste, Italy
Diploma Course in High Energy Physics.
- (1991 - 1994) Universidad de Los Andes, Mérida, Venezuela
M. Sc. in Astrophysics.
- (1983 - 1989) Universidad de Los Andes, Mérida, Venezuela
Licenciado en Física .

Present Position

Since October 1993, working at the Physics Department, Universidad de Los Andes, Mérida. Hired under the program “Plan II de Formación de Personal e Intercambio Científico del CDCHT-ULA”, through open exam (”concurso”). From August 1996, Assistant professor. Became Associate professor in July 2002.

Director of “Centro de Física Fundamental” , Physics Department, Universidad de Los Andes, since February 2004.

Member of the Physics Department Council since July 2003.

Professor at the PhD program “Posgrado en Física Fundamental”, Universidad de Los Andes.

Academic awards and other achievements

- National Science Award *Premio de la Fundación Empresas Polar “Lorenzo Mendoza Fleury”*, XIII edición, 2007.

- “Lisandro Alvarado” award to the “Best scientific paper in basic sciences” 2003, Universidad Centrooccidental Lisandro Alvarado, Barquisimeto, Venezuela, for the paper “ Self gravitating domain walls and the thin-wall limit”, in collaboration with Nelson Pantoja and Rommel Guerrero.
- Since 1994, member of the “Sistema de Promoción al Investigador” (SPI), of CONICIT. Level II Researcher since 2001. The SPI Programme is a government-sponsored system that classifies Venezuelan researchers in a five-level system according to their scientific achievements, from Level 0 to Level IV (maximum).
- Received the “Programa de Estímulo al Investigador (PEI)” award of Universidad de Los Andes 5 times since 1995. These awards are destined to ULA research personnel.
- Since January 2000, Junior Associate Member of the “Abdus Salam International Centre for Theoretical Physics”(ICTP), Trieste.
- Fellowships received:
 - SISSA Fellowship for PhD students
 - ICTP Fellowship for Diploma Students
 - FONACIT Fellowship during sabbatical leave from ULA, 2002-2003. During the sabbatical leave, worked at ICTP High Energy Physics group.
 - “Plan 2 Fellowship” form Universidad de Los Andes, during M.Sc. studies.
 - Teaching assistanship during B.Sc. studies at Universidad de Los Andes

Thesis

1. Ph.D. Thesis entitled “Broken Symmetries at high Temperatures”.

Abstract: Theories with spontaneous symmetry breaking achieved through the vacuum expectation value of more than one field provide the possibility of avoiding symmetry restoration at high temperature. This mechanism provides a way out of the topological defects problems. Theories with discrete symmetries such as spontaneously broken P, CP and Peccei-Quinn symmetries are studied and it is shown that the domain wall formation can be avoided. Grand unified SU(5) theory is studied as an example of a gauge symmetry than can avoid restoration at high temperature, thus eliminating the monopole problem. It is shown that this can happen in minimal SU(5). Symmetry restoration in supersymmetric theories is also studied.

2. M.Sc. Thesis entitled “Slowly rotating spheres in general relativity”
Abstract: A general setup for studying axisymmetric fluids in general relativity representing a slowly rotating object is established, based on a seminumerical approach.
3. Diploma Course Thesis entitled “Inflationary cosmology”.

Publications:

1. R. Guerrero, A. Melfo, N. Pantoja and R. O. Rodriguez, “**Close to the edge: Hierarchy in a double braneworld,**” *Phys. Rev. D* **74** (2006) 084025 [arXiv:hep-th/0605160].
2. A. Melfo, N. Pantoja, J. D. Tempo, “**Fermion localization on thick branes**”, *Phys. Rev. D* **73** (2006) 044033 [arXiv:hep-th/0601161].
3. B. Bajc, A. Melfo, G. Senjanovic, F. Vissani, “**Fermion mass relations in a supersymmetric SO(10) theory,**” *Phys. Lett. B* **634** (2006) 272 [arXiv:hep-ph/0511352].
4. B. Bajc, A. Melfo, G. Senjanovic, F. Vissani, “**Yukawa sector in non-supersymmetric renormalizable SO(10)**”, *Phys. Rev. D* **73** (2006) 055001 [arXiv:hep-ph/0510139].
5. O. Castillo-Felisola, A. Melfo, N. Pantoja, A. Ramirez, “**Localizing gravity on exotic thick 3-branes**” *Phys. Rev. D* **70**, 104029 (2004) [arXiv:hep-th/0404083]
6. B. Bajc, A. Melfo G. Senjanovic, F. Vissani,
The minimal supersymmetric grand unified theory I: symmetry breaking and the particle spectrum
Physical Review D **70**, 035007 (2004).
7. C. S. Aulakh, B. Bajc, A. Melfo, G. Senjanovic, F. Vissani,
The minimal supersymmetric grand unified theory
Physics Letters B **588**, 196 (2004).
8. A. Melfo, G. Senjanović,
Minimal supersymmetric Pati-Salam theory: Determination of physical scales
Physical Review D **68** (2003), 035013.
9. A. Melfo, N. Pantoja, A. Skirzewski
Thick domain wall spacetimes with and without reflection symmetry.
Physical Review D **67** (2003) 105003.

10. R. Guerrero, A. Melfo, N. Pantoja, **Self-gravitating domain walls and the thin-wall limit**, *Phys. Rev. D* **65**, 125010 (2002)
11. C.S. Aulakh, B. Bajc, A. Melfo, A. Rašin, , G. Senjanović, **SO(10) Theory of R-parity and neutrino mass**, *Nuc. Phys. B.* **597**, 89 (2001).
12. C.S. Aulakh, B. Bajc, A. Melfo, A. Rašin, G. Senjanović, **Intermediate scales in supersymmetric GUTs: The Survival of the fittest** *Phys. Lett.* **B460**, 325 (1999).
13. C. S. Aulakh, A. Melfo, A. Rašin , G. Senjanović
See-saw and supersymmetry or exact R-parity.*Phys. Lett.* **B459**, 557 (1999).
14. C. S. Aulakh, A. Melfo, A. Rašin , G. Senjanović
Supersymmetry and Large Scale Left-Right Symmetry, *Phys. Rev.* **D58** 115007 (1998).
15. C. S. Aulakh, A. Melfo, , G. Senjanović
Minimal Supersymmetric Left-Right Model , *Phys. Rev.* **D57** 4174 (1998).
16. B. Bajc, A. Melfo , G. Senjanović
On supersymmetry at high temperature, *Phys. Lett.* **B387** 796 (1996)
17. G. Dvali, A. Melfo, , G. Senjanović
Nonrestoration of Spontaneously Broken P and CP at high temperature, *Phys. Rev.* **D54** 7857 (1996).
18. A. Ferrera, A. Melfo,
Bubble collisions and Defect Formation on a Damping Environment, *Phys. Rev.* **D53** 6852 (1996).
19. G. Dvali, A. Melfo, G. Senjanović
Symmetry Nonrestoration at High Temperature and the Monopole Problem. *Phys. Rev. Lett.* **75**, 4559 (1995).
20. A. Melfo, L. Perivolaropoulos
Formation of Vortices in First Order Phase Transitions *Phys. Rev.* **D52**, 992 (1995).
21. L. Herrera, A. Melfo, L. A. Núñez A. Patiño
Radiating, Slowly Rotating Bodies in General Relativity *Ap. J.*, **421**, 677 (1994).
22. A. Melfo, L. A. Núñez
Checking Collineation Vectors with REDUCE.
Gen. Rel. Grav., **24**, 1125 (1992) .

23. A. Melfo, L. A. Núñez, U. Percoco V. Villalba
Collineations of the Goedel-Type Spacetimes.
J. Math. Phys., **33**, 2258, (1992) .
24. A. Melfo, H. Rago
Conformally Flat Solutions to the Einstein-Maxwell System
Astrophysics and Space Science, **193**, 9, (1992) .

Communications to Scientific Meetings:

1. "On grand unification with SO(10)", BW2007 Workshop, Kladovo, Serbia, September 2-9, 2007.
2. "Yukawa sector in SO(10)", *International Workshop on High Energy Physics*, IIT Roorkee, India, march 2007.
3. "Grand unification with and without supersymmetry", *VI Congreso Latinoamericano de Física de Altas Energías* SILAFAE, Puerto Vallarta, México, 30 October- 8 November 2007,
4. "Localizing fermions on thick branes", Planck06, Paris, France, June 2006.
5. "Fermion mass relations in SO(10) " Rencontres de Vietnam, Hanoi, Vietnam, January 2006.
6. "Neutrino mass in supersymmetric SO(10)", Gran Sasso Summer Institute, L'Aquila, Italia, August 2005.
7. "Gran Unificación Supersimétrica", invited talk in *Reunión de Física de Altas Energías FAE04*, USB, Caracas, December 2004.
8. "SO(10) as the minimal supersymmetric GUT", in *V Congreso Latinoamericano de Física de Altas Energías*, Lima, Perú, July 2004.
9. "Modelos supersimétricos con simetría left-right", in *IV Congreso de la Sociedad Venezolana de Física*, Porlamar, Venezuela, November 2003.
10. "Left-Right symmetry in supersymmetric GUTs" (con C.S. Aulakh, B. Bajc y G. Senjanović), en BW 2003, Vrnjacka Banja, Serbia, Agosto 2003.
11. With G. Senjanović y B. Bajc, " Proton decay and fermion masses in supersymmetric grand unified theories".
International Conference on 20 Years of SUGRA and Search for SUSY and Unification (SUGRA 20), Boston, Massachusetts, 17-20 de Marzo 2003.
12. " Thick and thin domain walls" talk given at the *8th. Summer Institute at Gran Sasso National Laboratory: New Dimensions in Astroparticle Physics*, Assergi, Italia,7-19 de Julio 2002.

13. “Gravitational properties of domain walls”, talk given at the *Annual Meeting of the Hellenic Society for the Study of High Energy Physics*, University of Patras, Grecia, 25 al 27 de abril 2002.
14. “Phenomenological implications of gauged R-parity”, talk given at the *SUSY-98 Conference*, Oxford University, Oxford, July 1998.
15. “Supersymmetry at high temperature”, talk given at the *Third Warsaw Workshop: Physics from the Planck Scale to Electroweak scale*, Warsaw, Poland, April 1997.
16. With L. Perivolaropoulos, “Defects in First Order Phase Transitions”
14th International Conference on General Relativity and Gravitation, Florence, Italy, August 1995.
17. With G. Senjanović, “Broken Symmetries in the Early Universe”
International Workshop on Elementary Particle Physics: Present and Future, Valencia, Spain, June 1995.
18. With L. Herrera, L. A. Núñez and A. Patiño
Radiating, Slowly rotating Bodies in General Relativity,
13th International Conference on General Relativity and Gravitation
Cordoba-Argentina, June 1992.
19. With L. A. Núñez, U. Percoco and V. Villalba.
Ricci and Contracted Ricci Collineations of the Goedel-Type Spacetimes.
VII Latin-american Symposium on Relativity and Gravitation.
Cocoyoc-México, December 1990.

Thesis directed

1. José Luis García, *Formación de paredes de dominio en transiciones de fase de primer orden*. B. Sc. Thesis, Universidad de Los Andes, Mérida, 2002.
2. Rommel Guerrero, *Efectos Gravitacionales en paredes de dominio*. M. Sc. Thesis, Universidad de Los Andes. Mérida, 2002.
3. José David Tempo, *Localización de fermiones sobre branas gruesas*, B. Sc. Thesis, Universidad de Los Andes, Mérida, 2004.
4. Alba Ramírez, *Espectro de masas en una teoría $SO(10)$ supersimétrica*, M. Sc. Thesis, Universidad de Los Andes. Mérida, 2006.
5. Rommel Guerrero, *Mundos-Brana Asimétricos*. Ph. D. Thesis, Universidad de Los Andes. Mérida, 2006.