

## Lecian Orchidea Maria

Position: Phd Student

Period covered: 1<sup>st</sup> November 2005-31<sup>st</sup> October 2008



### I Scientific Work

Modern approaches to generalized theories of gravity

### II Conferences and educational activities

Conferences and Other External Scientific Work:

#### 1) Education

- Winter-Spring 2008: followed the lectures Early Cosmology (Sapienza PhD lectures) held by Prof. G. Montani at University "Sapienza", Rome.
- 11-20 September 2007: followed the doctoral school Central European School in Particle Physics, held at Charles University, Prague.
- Winter-Spring 2007: followed the lectures (Sapienza PhD lectures) Phenomenology of the Standard Model and its Supersymmetric extensions, held by Dr. Franco, Dr.ssa Mele, Dr. Mena, Dr. Silvestrini at University "Sapienza", Rome.
- 28 November-17 December 2006: followed the doctoral school "Gravitational Waves, Relativistic Astrophysics and Cosmology", held at Centre Emil Borel, Institut Henri Poincaré, Paris.
- Autumn 2006: followed the lectures "Riemannian Geometry" given by Prof. S. Marchiafava, and "Group Representation Theory" given by Prof. C. De Concini, held at University "Sapienza", Mathematics department.
- Spring 2006: followed the doctoral lectures (IRAP PhD) "Geometrodynamics and matter fields" held by Dr. G.Montani at University "Sapienza", Rome.
- January 2006: followed the doctoral lectures (IRAP PhD) "Mathematical Problems Of General Relativity Theory" held by Prof. D. Christodoulou at ETH, Zurich.
- Autumn 2005: followed the lectures "An introduction to Quantum Gravity" held by Dr. G.Amelino-Camelia at University "Sapienza", Rome.

## 2) Talks

- 8-18 July 2008: participated in the workshop “The III Stueckelberg Workshop” (main lecturer: Prof. G. 't Hooft), in Pescara (Italy), with three contributions “Stueckelberg: a forerunner of Modern Physics III”, “Recent approaches to modified-gravity theories” and “The Taub Universe viewed in a Polymer Quantization Approach”.
- 24-29 September 2007: participated in the meeting “XCIII Congresso Nazionale Società Italiana di Fisica” in Pisa (Italy), with the contribution “Dark energy as a relic of the vacuum-energy cancellation”.
- 3-8 September 2007: participated in the workshop “II Stueckelberg Workshop” (main lecturers: Prof. T. Thiemann, Prof. T. Damour), in Pescara (Italy), with three contributions “Stueckelberg: a forerunner of Modern Physics II”, “Exponential Lagrangian for the gravitational field and the problem of vacuum energy” and “Fundamental symmetries of the extended space-time”.
- 20-30 July 2007: participated in the meeting “4th Italian-Sino Workshop on Relativistic Astrophysics”, in Pescara (Italy), with the contribution “Scalar-tensor analysis of an exponential Lagrangian for the Gravitational Field”.
- 25-30 June 2007: participated in the meeting “10th Italian-Korean Symposium on Relativistic Astrophysics”, in Pescara (Italy), with the contribution “The role of torsion in fermion interactions”.
- 13-17 April 2007: participated in the “APS April Meeting”, in Jacksonville (Florida, USA), with the contribution “Lorentz Gauge Theory and its Phenomenological Implications”.
- 18-23 September 2006: participated in the meeting “XCII Congresso Nazionale Società Italiana di Fisica” in Turin (Italy), with the contribution “The role of torsion within a gauge theory of the Lorentz group”.
- 23-29 July 2006: participated in the meeting “Eleventh Marcel Grossmann Meeting on General Relativity” in Berlin (Germany), with the contribution “Electro-Weak Model within a 5-dimensional Lorentz group theory”.
- 10-20 July 2006: participated in the meeting “The third Italian-Sino Workshop on Relativistic Astrophysics”, in Pescara (Italy), with the contribution “Accelerated Universe from an exponential Lagrangian of the metric field”.
- 26 June-3 July 2006: participated in the meeting “I Stueckelberg Workshop” (main lecturer: Prof. A. Ashtekar), in Pescara (Italy), with two contributions “Stueckelberg: a forerunner of Modern Physics” and “Electro-weak Model within the framework of Lorentz gauge theory: Ashtekar variables?”.
- 5-16 February 2006: participated in the international meeting “The first Bego Scientific Rencontre” in Nice (France), with the contribution “Lorentz gauge theories and the Electro-Weak model”.

### 3) Seminars

- CGM Seminars 2008 (Sapienza)

(i) 25.01.08 : "Polymer representation and GNS construction: fundamentals and applications"

- CGM Seminars 2007 (Sapienza)

(i) 30.03.07 : "An introduction to spin foams".

- ICRA Seminars on Quantum Gravity 2006 (Sapienza):

(i) 11.04.2006 : "Generalized uncertainty principle, noncommutative spacetime and the scalar field".

(ii) 23.05.2006 : "Functional approach to quantum gravity".

### 4) Meetings

-29 September-4 October 2008: participated in the meeting "Quantum Spacetime and Noncommutative Geometry", held at Department of Mathematics, University of Rome Sapienza, Italy.

- 19-20 June 2006: participated in the meeting "Plank scale in astrophysics and cosmology", held at "Università degli Studi di Roma Sapienza", Rome;

- 10-20 June 2005: participated in the meeting "II Italian-Sino Workshop on Relativistic Astrophysics: Probing the Dark Universe", Pescara (Italy);

- 27 June-1 July 2005: participated in the meeting "The Russian-Italian Lifshitz-Zeldovich Meeting on Relativistic Astrophysics", Pescara (Italy).

### Work With Students

-November 2007 -January 2008: Collaboration grant by University Sapienza as teaching assistant (50 hours) of Prof. R.Capitanelli for the lectures "Fundamentals of Calculus and Analysis II".

## III 2007-2008 List of Publications

S. Casanova, O.M. Lecian, G. Montani, R. Ruffini and R. Zalaletdinov, A generalization of Schouten classification for non-Riemannian geometries with asymmetric metric, Mod. Phys. Lett. A, 23, 17-23 (2008) [arXiv:0712.3716].

O.M. Lecian and G. Montani, Scalar-tensor analysis of an exponential Lagrangian for the Gravitational Field, AIP Conference Proceedings, 966 Relativistic Astrophysics: 4th Italian-Sino Workshop, p.264 [arxiv: 0710.0544] (refereed).

O.M. Lecian and G. Montani, Electro-weak Model within the framework of Lorentz gauge theory: Ashtekar variables?, - Nuovo Cim. B122, 207 (2007) [gr-qc/0702026].

N. Carlevaro, O.M. Lecian and G. Montani, Macroscopic and microscopic paradigms for the torsion field: from the test-particle motion to a Lorentz gauge theory, Ann. Fond. L. de Broglie, 32 (2-3), 281-295 (2007) (invited paper) [arXiv:0711.3538].

F. Cianfrani, O.M. Lecian and G. Montani, Fundamentals and recent developments in non-perturbative canonical Quantum Gravity [arXiv:0805.2503]

O.M. Lecian, G. Montani, Riemannian and non-Riemannian extensions of geometrodynamics versus Einsteinian gravity, to appear on J. Korean Phys. Soc. [arxiv:0712.3726].

F. Cianfrani and O.M. Lecian, Stueckelberg: a forerunner of Modern Physics, II Nuovo Cim. B122 , 123 (2007)[physics/0701340].

N. Carlevaro, O.M. Lecian, and G. Montani, Lorentz Gauge Theory and Spinor Interaction, Int. J. Mod. Phys. A, 23(8), 1248 (2008) [arXiv:0801.4242].

O.M. Lecian and G. Montani, Fundamental symmetries of the extended space-time, Int. J. Mod. Phys. A, 23(8), 1266 (2008)[arXiv:0803.1629].

O.M. Lecian and G. Montani, Exponential Lagrangian for the gravitational field and the problem of vacuum energy, Int. J. Mod. Phys. A, 23(8), 1286 (2008) [arXiv:0803.1620].

F. Cianfrani and O.M. Lecian, Stueckelberg: a forerunner of Modern Physics II, Int. J. Mo-O.M. Lecian, G. Montani, Implications of non-analytical  $f(R)$  gravity at Solar-System scales, submitted to CQG, [arXiv:0807.4428].

M.V. Battisti, O.M. Lecian, G. Montani, Polymer Quantum Dynamics of the Taub Universe, to appear on PRD, [arXiv:0806.0768].

O.M. Lecian and G. Montani, Novel Analysis of Spinor interactions and non-Riemannian geometry, submitted to Journ. Math. Phys.

N. Carlevaro, O.M. Lecian, G. Montani, Fermion dynamics by internal and Spacetime Symmetries, submitted to Europhysics Letters.

O.M. Lecian and G. Montani, Dark Energy as Relic of the Vacuum Energy Cancellation?, Int. J. Mod. Phys. D, 17, 111 (2008)[arXiv:0709.1400].d. Phys. A, 23(8), 1105 (2008)[arxiv:0803.1583].

Orchidea Maria Lecian was born in Rome on December 15th 1980. She got a Master Degree in Physics at University of Roma Sapienza with a thesis on “Kaluza-Klein theories” under the supervision of Dr. Giovanni Montani and Prof. Remo Ruffini.

Then she became an IRAP-PhD student and he focused her research activity on General Relativity and its extensions. Orchidea Maria Lecian has followed, during the three years of her Ph.D., all the lectures of the PhD program and also other lectures held at University of Rome La Sapienza, both at the Physics Department and at the Mathematics Department. She has been presenting her research in international meetings and workshops, having the results been published in many conference proceedings and international refereed journals.

She is also a member of ICRA, SIF (Societa' Italiana di Fisica) and APS (American Physics Society).