Università di Genova

Sante Carloni

Associate Professor

EDUCATION AND TRAINING

[Example: university degree, high school diploma]

Jan 2001- Dec 2022
PhD in theoretical physics ("Dottorato di Ricerca in fisica")
Thesis: Cosmology in Extended Theories of Gravitation

The thesis presents a comprehensive analysis of cosmological models based on three specific extensions of General Relativity: scalar-tensor theories of gravity, higher-order theories of gravity, and theories of gravity with torsion. Special focus is given to the curvature quintessence model, where the non-Einsteinian component of gravitational interaction acts as the homogeneous dark energy component, capable of driving an accelerating expansion.
The PhD focused on studies in gravitation, astrophysics, and cosmology. It included a series of courses in astrophysics, cosmology, relativity, linear perturbation theory, low-energy physics, and particle physics. During this period, I also served as a teaching assistant.
Department of Physics, University of Salerno

Oct 19195- October 2000
Msc in physics ("Laurea vecchio ordinamento in fisica")
Thesis: Cosmological Constant and Gravitational Coupling in Extended Theories of Gravitation
The thesis addresses two main aspects of modified theories of gravitation: the variable gravitational coupling and the creation of an effective cosmological term. Both are discussed in relation to observational results.
Department of Physics, University of Salerno

PROFESSIONAL HISTORY

Jan 2020- Dec 2022
Research fellowship ("Ricercatore Universitario tipo B")
DIME - Department of Mechanical, Energy, Management and Transportation Engineering
University of Genova

Jul 2014- Dec 2019
Research fellowship (FCT Investigator: Development Grant)
Duties: Assist in the teaching and research activities of CENTRA and the Department of Physics. Establish and lead an independent research team composed of Master's and PhD students and Postdoctoral fellows.
Research: Examine the phenomenological implications of modified theories of gravitation at cosmological, astrophysical, and Solar System scales with the goal of constraining and/or excluding these theories.
CENTRA- Instituto Superior Tecnico, University of Lisbon

Università di Genova

Nov 2013- Jul 2014
Postdoctoral fellowship
Duties: Conduct research in the physics of gravitation, dark energy, and cosmology. Assist with teaching the department's advanced relativity courses. Institute of Theoretical Physics, Charles University in Prague

Nov 2013- Jul 2014
Research Fellowshio in Fundamental Physics
Duties: Conduct research in the physics of gravitation, dark energy, and cosmology. Organize and coordinate research programs between ESA and universities in ESA member countries. Provide support on problems related to theoretical physics for ESA's general study program and other directorates. Collaborate with other members of the research team on multidisciplinary research projects.
Research: The research activity focused on the proposal of new tests of General Relativity based on the physics of the Solar System, the development of purely relativistic global positioning systems, and the study of the transformational approach to metamaterials
Advanced Concepts Team, European Space Agency/ESTEC

Oct 2008 - Oct 2010
Beatriu de Pinós Fellowship
Duties: Pursue research in physics of gravitation, dark energy and cosmology.
Research: During this period, the research activity focused on investigating the properties of fourth-order gravity at the cosmological level.
Institut De Ciéncies De l'Espai Universitat Autònoma de Barcelona

Jan 2006 - Oct 2008
Claude Leon Postdoctoral Fellowship
Duties: Conduct research in gravitation physics, dark energy, and cosmology. Teach the master's course "Hot Topics in Cosmology."
Research: In this period, the research activity focused on the construction of a covariant gauge invariant theory of cosmological perturbations of modified gravity.
Department of Mathematics and Applied Mathematics, University of Cape Town

Jan 2004 - Dec 2005
Postdoctoral fellowship
Duties: Conduct research in gravitation physics, dark energy, and cosmology. Organize weekly group seminars.
Research: During this period, the research focused on applying the dynamical system approach and the 1+3 and 1+1+2 covariant methods to modified gravity, particularly to f(R)-gravity.
Department of Mathematics and Applied Mathematics, University of Cape Town

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EXPERIENCE

PARTICIPATION TO CONFERENCES AS A SPEAKER

2025, Jiri Bicak Memorial conference, Prague
2023, Perspectives on Large Scale Structure, Prague
2021, Meeting SIGRAV, Urbino

RECENT SEMINARS

03/2025 Covariant gauge-invariant perturbations of compact stellar objects, African Mathematical Institute, Cape Town
04/2024 Generalizing the coupling between matter and gravity, CEICO, Prague
01/2024 Covariant Junction conditions in General Relativity, Univerisità di Torino

RECENT PHD AND MASTER'S STUDENTS

2024-today Alena Vanzurova (Ma) Masaryk University in Brno
2024-today Ujjwal Agarwal (PhD) Charles University in Prague
2020-2024 Ujjwal Agarwal (PhD) Fabrizio Esposito (PhD) Università di Genova

RECENT TEACHING AT FOREIGN UNIVERSITIES AND RESEARCH INSTITUTES

2013-2024 "Theoretical Cosmology", Charles University in Prague
2018 Lectures in Relativistic Cosmology, "9ª Escola de Verão de Astrofísica e Gravitação (EAG9)", Instituto Superior Tecnico, Lisbon