Curriculum vitae - Dr. Valentina Mantovani Sarti

Personal information

Family name and first name: Mantovani Sarti, Valentina
Researcher unique identifier: ORCID: 0000-0001-8438-3966
Date of birth, Nationality: 08.01.1984, Italian

Education

2008-2012 **Ph.D in Astroparticle Physics co-hosted at University of Ferrara and University of Valencia**

"Scaled chiral-quark solitons for nuclear matter"

Supervisors: Prof. Alessandro Drago and Prof. Vicente Torres Vento

The aim of the thesis was to develop a chiral model starting from quarks as degrees of freedom and to study restauration of chiral symmetry and confinement at finite density and zero temperature. The successful implementation of another QCD symmetry, scale invariance, in the model allowed to stabilize the chiral model also at higher nuclear densities, comparable to the ones reached in the core of neutron stars.

2005-2008 **Masters in Nuclear and Subnuclear Physics**, University of Ferrara, Italy. Graduated cum laude, with final mark 110/110

Research activity

Current position

Experimental Physics

July 2021-July 2024 **Principal Investigator, TUM**

"Investigation of inelastic channels in femtoscopy", 3 years grant funded from Deutsche Forschungsgemeinschaft (DFG)

The main goal is to investigate the role of inelastic channels in hadron-hadron interactions by means of femtoscopic correlations. The PI will develop a framework able to analyse available femtoscopic data and make predictions on interactions characterised by the presence of inelastic channels (absorption and annihilation processes), such as baryon-

antibaryon, antikaon-nucleons and interactions involving multi-strange hadrons (Ω-Ω).

Previous positions

Experimental Physics

2017-July 2021 **Postdoctoral fellowship, TUM**

"Constraining hadron-hadron interactions in elementary collisions in ALICE with femtoscopy"

Advisor: Prof. L. Fabbietti

Joined the ALICE Collaboration in 2017 and since then involved in several analysis of baryon-baryon, baryon-antibaryon and meson-baryon correlations at ALICE in p-p, p-Pb collisions in order to study the strong interaction. Particular focus has been addressed to interactions relevant for the physics of neutron stars being an active member of the Collaborative Research Center "Neutrinos and Dark matter in Astro and Particle Physics" SFB1258.

Theoretical Physics

2016-2017 **Postdoctoral fellowship, University of Turin**

"Effective QCD models for fluctuations of conserved charges in the deconfinement transition from hadrons to quarks in heavy-ion physics"

Advisor: Prof. W. Alberico

Involved in the analysis of fluctuations containing strangeness in the deconfinement transition hadrons-quarks by means of perturbative models and at the chemical freeze-out occurring in heavy ion collisions through by means of hadron resonance gas models (HRG) and lattice data. Investigated in detail the role played by resonances with strangeness in HRG and lattice in order to study the effect of these states in the freeze-out parameters.

2013-2016 **Postdoctoral fellowship, University of Turin – INFN Turin**

"Non perturbative methods in Quark-Gluon Plasma physics"

Advisor: Prof. W. Alberico and Prof. C. Ratti

Involved in developing a new approach to determine the chemical freeze-out parameters in heavy-ion collisions by means of fluctuations of

conserved charges. Focused on the comparison of the hadronic spectrum predicted by HRG and lattice calculations.

2012-2013 **Postdoctoral fellowship, University of Ferrara**
"Nuclear matter based on chiral models"
Advisor: Prof. A. Drago
Continuation of the study performed during her Ph.D studies based on the chiral soliton model by extracting additional quantities (as magnetic and electric form factor) relevant to be compared to experimental data.

Fellowships and Awards

2009 Soroptimist Award for Scientific Research, Soroptimist International, Ferrara, Italy

2008-2012 PhD fellowship grant, Ministry for Italian University and Research, Italy

Coordination and supervision activity

Supervision of graduate and Ph.D students

Since 2012 Supervision of 7 PhD students (5 experimental and 2 theoretical),
3 Masters students (1 experimental and 2 theoretical), and
2 Bachelor student (1 experimental and 1 theoretical).
Supervised at TUM-Germany, University of Turin,-Italy / University of Ferrara-Italy.

Activity in coordination roles

Since 2020 Convener of the femtoscopy Physics Analysis Group (PAG) in ALICE Collaboration.

Since 2021 Coordinator and Main Contributor, new software development to be used in correlation analyses during Run 3 of ALICE, TUM Correlation Technique Group, Germany

Since 2017 One of 2 main developers of the analysis tool CATS, largely used for correlation technique results in ALICE, TUM, Germany.

Organization of scientific meetings

Since 2020 Responsible for the organization of the local weekly Femtoscopy group meeting at TUM (FemTUM).

2020 Convener, "Femtoscopy and light nuclei" online session,

	Forschungsschwerpunkt (FSP) ALICE Meeting, Germany
Since 2019	Member of the local organization of **"FemTUM: Workshop on femtoscopy and hadron-hadron interactions"**, 2 day-workshop with more than 30 theoretical and experimental physicists from Germany, Italy, Netherlands, Japan, in Munich, Germany in 2019 and 2022

Teaching and scientific outreach activity

Latest teaching activity

2022-2023	Assistant for the **Physikalisches Grundpraktikum 1** in the Physics Degree Program at TUM held by Prof. M. Saß. Responsible for exercises in the "**Nuclear, Particle and Astrophysics 1**" in the Physics Degree Program at TUM held by Prof.L. Fabbietti and Prof. G. Zanderighi
2020-2021	Responsible for exercises and interactive activity during online lectures of **"Nuclear, Particle and Astrophysics 2"** in the Physics Degree Program at TUM held by Prof. L. Fabbietti and Prof. M. Beneke and of **"Hadrons at accelerators and astrophysical observables 1 and 2"** in the Physics Degree Program at TUM held by Prof. L. Fabbietti.
2019-2020	Responsible for exercises of **"Electrodynamics"** in the Physics Degree Program at TUM held by Prof. N. Kaiser.
2018-2019	Responsible for exercises of **"Nuclear, Particle and Astrophysics 2"** in the Physics Degree Program at TUM held by Prof. S. Paul and of **"Thermodynamics and statistical mechanics"** held by Prof. N Kaiser.
2017	Responsible for exercises of **"Physics 1: electricity and magnetism"** in the Chemistry Degree Program at University of Turin held by Prof. S. Massaro, Prof. M. Destefanis and Prof. S. Uccirato. Lecturer in the Ph.D course **"Introduction to the physics of the Quark-Gluon-Plasma"** at University of Turin.

Outreach activity

2022 — Participation as an invited speaker to the event **"Yes Indeed I am a physicist" 2022**. Presentation to bachelor and masters students of my research path, my research topic and what is for me to be a woman in physics.

2021 — Participation as an invited speaker to the EU-Emilia Romagna project **"A tutto STEAM! Protagoniste al femminile oltre gli stereotipi di genere"**. Presentation in two online meetings presented of my research and my career to students of middle school and high school.

2017-2021 — Active member in outreach projects within the SFB1258 "Neutrinos and Dark Matter in Astro- and Particle Physics" program. Coordinator of the art and science program **"Indeed, I am a physicist"** in collaboration with the photographer Roberto Grillo. The project addresses the distorted vision of scientists in our society with particular emphasis on unveiling the unconscious bias towards the presence of female researchers in Physics.

Research collaborations

Future (Planned)

2023-2024 — **Principal Investigator, "CATS^3: Coupled-Channel effects in the Correlation Analysis Tool using the Schrödinger equation"**, TUM; planned collegial collaborations with Prof. J. Haidenbauer Julich, Forschungszentrum; Prof. B. Loiseau, Institut de Physique Nucléaire d'Orsay; Prof. T. Hatsuda from RIKEN Advanced Science Institute; Dr. Y. Kamiya, Institute of Theoretical Physics, Chinese Academy of Sciences; Prof A. Ohnishi, Yukawa Institute for Theoretical Physics, Kyoto University; Prof. J. Schaffner-Bielich, Goethe-Universität Institut für Theoretische Physik Frankfurt; Prof. F. Giacosa Professor at the Institute of Physics, Jan Kochanowski University

Current

Since 2017 — **Member of ALICE Collaboration**, active in the analysis of two-particle correlations femtoscopic data in the TUM "Dense and Strange Hadronic matter" group lead by Prof. L. Fabbietti.

Collaborations with several theoreticians, Prof. J. Haidenbauer, Prof. T. Hyodo, Prof. T. Rijken, Prof. T. Hatsuda, Prof. A. Ohnishi, Dr. K. Sasaki and Dr. Y. Kamiya, Prof. A. Kviesky, Prof. Viviani and Prof. L. Marcucci in order to provide comparison between data and models.

Member of the Collaborative Research Center "Neutrinos and Dark matter in Astro and Particle Physics" SFB1258 in the M07 group focused on the study of the equation of state of neutron stars.

Since 2013 — Collaboration with **Prof. C. Ratti and Prof. J. Noronha-Hostler** on the statistical hadron gas model´s applications to lattice and heavy-ion data and on the effect of the hadronic spectrum in the chemical freeze-out and in the hydrodynamics evolution of heavy-ion collisions.

Career breaks

None.
Significant career trajectory shift from theoretical physics to experimental physics in 2017.

Overview of scientific publications

Results of research produced during PhD and postdoctoral period have been published in leading scientific journals – supporting advancements within both the theoretical and the experimental fields. Scored an h-index of 29, according to INSPIRE-HEP, with more than 10 theoretical papers as co-author, of which only 4 were carried out with PhD supervisors. Active author in the ALICE Collaboration since joining in 2017.

Scientific contributions in 10+ significant publications on results obtained with the correlation technique. Main author of more than 6 ALICE publications focused on two-particle correlations in pp collisions. Recently co-authored a review publication on the correlation technique in small colliding systems.

Latest talks

2022 **"Precision studies of the strong interaction in Λ-hadron systems up to S =−3 with ALICE "** parallel talk at Quark Matter 2022 Krakow (Poland) on behalf of the ALICE Collaboration

2021 **"Femtoscopic measurements at LHC and bearing on astrophysics"** Invited talk to the international workshop Strangeness in Neutron Stars – Physics at J-PARC HIHR/K1.1 beam lines 2021 – Online edition

"**Accessing the coupled-channels dynamics using femtoscopic correlations with ALICE at LHC**" at 22nd online Particles And Nuclei International Conference (PANIC) 2021.

2020 **"A brand new approach to constrain hadron-hadron interactions using femtoscopy in ALICE"** at Bormio Winter workshop (Bormio).

2019 **"Kaon-proton and proton-Λ femtoscopy in ALICE: going beyond scattering experiments"** at the workshop Hadron interactions and polarization from Lattice, Quark Model and High-Energy Collisions (YITP Kyoto).

Recent Invited talks

2022 **Invited plenary speaker at International Nuclear Physics Conference (INPC) 2022** with the talk "The hyperon puzzle in neutron stars".

2021 **Invited plenary speaker at Online Strangeness in Quark Matter 2021 (SQM21)** with the talk "Hyperon-nucleon femtoscopy, nuclear production, and bearing on astrophysics".

Invited speaker to online workshop "Strangeness in Neutron Stars -- Physics at J-PARC HIHR/K1.1 beam lines" with the talk "Femtoscopic measurements at LHC and bearing on astrophysics".

Invited speaker to online "Hadron in Nucleus 2020" (HIN2020) with the talks "Accessing the coupled-channels dynamics with femtoscopy correlations at LHC".

2019 **Invited speaker at 35 Winter Workshop on Nuclear Dynamics (USA)** with the talk "p-Ξ and K-p femtoscopy in ALICE: going beyond scattering experiments".

2018 **Invited key-note speaker at Quarks and Nuclear Physics (QNP18, Japan)** with the talk "Constraining Hadron-Hadron interactions with femtoscopy in ALICE".