

# Europass Curriculum Vitae



## Personal information

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### Matteo Teodori

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## Research experiences

Dec. 2022 - Now  
  
June 2022 - Nov. 2022  
  
Feb. 2022 - June 2022  
  
From Dec. 2021

**PhD student at University of Campania "Luigi Vanvitelli"** in collaboration with **INAF - Osservatorio Astronomico d'Abruzzo** studying the dynamical evolution and multiple-populations in Globular Clusters. Supervisors: Prof. Oscar Straniero and Prof. Lucio Gialanella.

**Studentship at INAF - IAPS** entitled "Activity of study and formation of planetary structures, through modelling and/or remote sensing and/or laboratory data" concerning the projects "ExoMars", "Dawn" and "TRIS". Study of the numerical methods of Smoothed Particle Hydrodynamics for the simulation of hydrodynamic phenomena of interest for the mentioned projects.

**Internship at INAF - Astronomical Observatory of Rome**, finalized at learning the mathematical techniques of the "Information Field Theory" and their application to astronomical data, with reference to the high-contrast images produced within the SHARK-VIS project, an instrument intended for the LBT telescope for deep detection of exoplanets through direct images.

**Research collaborator at the Physics Department - University of Rome "La Sapienza"**, concerning the study of multi-mass models for Globular Clusters.

## Research Interests

Stellar dynamics, collisional systems, Globular Clusters, stellar systems and populations, gravothermal catastrophe, formation, evolution and stability of self gravitating systems. I am also interested in topics concerning gravity, stellar formation and evolution, dark matter, planetary sciences and numerical methods for simulations and data analysis.

## Education

16th Nov. 2021  
  
1st Oct. 2019

**Master degree in Astronomy & Astrophysics, University of Rome "La Sapienza", *cum laude*.** Thesis title: Gravothermal catastrophe in models of Globular Clusters with a mass distribution. Supervisor: Prof. Marco Merafina.

**Bachelor's degree in Physics, University of Rome "La Sapienza".** Dissertation title: Carbon ignition curves for massive stars. Supervisor: Prof. Oscar Straniero

## Publications

2022

Merafina M. and **Teodori M.**, "Generalization of the Fokker-Planck equation for stellar orbit diffusion in multi-mass star systems" [arXiv: 2205.10209]

## Collaborations

### Active

- Participation to scientific meetings of the research group lead by Prof. Marco Merafina at University of Rome "La Sapienza", concerning a research project entitled "Stellar evolution and dynamical evolution in Globular Clusters: theoretic development and N-body simulations".
- Collaboration with INAF-IAPS for the study of volatiles emission from planetary surface and fractures using a Smoothed Particle Hydrodynamics (SPH) approach. Member of the International Space Science Institute (ISSI) group led by Dott. Michelangelo Formisano, for the project "Thermophysical characterization of ice-rich areas on the surface of specific planetary bodies: conditions for the formation of a transient exosphere", active in the development of SPH codes able to collaborate with Eulerian codes.

### Past

- Collaboration with INAF-OAR for the development of codes for High Contrast Imaging for the SHARK-VIS project, finalized at the direct detection of extra-solar planets.

## Talks

- 16-20 Oct. 2023 **M. Teodori**, O. Straniero, M. Merafina and L. Gialanella, "*Dynamical evolution of Multiple Populations in Globular Clusters*", STARS Across the Universe, INAF - Osservatorio Astronomico di Capodimonte, Napoli, Italy.
- 6-10 Feb. 2023 **M. Teodori**, G. Magni, M. Formisano, M. C. De Sanctis and F. Altieri, "*Volatiles emission from a fracture on a planetary surface: a Smoothed-Particle-Hydrodynamics approach*", XVIII Congresso Nazionale di Scienze Planetarie, Perugia, Italy.
- 14th Nov. 2022 **M. Teodori**, "*Multi-mass collisional stellar systems models for Globular Clusters*", G11 Workshop, Physics Department, University of Rome "La Sapienza".

## Posters

- 8-12 May 2023 **M. Teodori**, G. Magni, M. Formisano, M. C. De Sanctis and F. Altieri, "*Volatiles emission from a cavity on a planetary surface using smoothed particle hydrodynamics*", Biennial European Astrobiology Conference BEACON 2023, La Palma & Teneguia Princess Hotel on Fuencaliente, La Palma Island, Canary Islands, Spain.

## PhD schools

- 2-6 October 2023 INAF - Scientific Communication in Astronomy School, Bertinoro, Italy.

## Seminars

- 16th Feb. 2023 **Held**  
**M. Teodori**, "*The interconnection between multi-mass dynamical models and multiple populations in Globular Clusters*", INAF-OOAb colloquia.
- 15 June 2023, 11:30 **Followed**  
OAPD Seminar, Good practice in science talks, Roberto Decarli (INAF-OAS Bologna).
- 24 May 2023, 16:00 Astroseminar, Hierarchical Black Hole Mergers: A Multi-Band Opportunity for Gravitational Waves, Giacomo Fragione (CIERA Fellow, Northwestern University, Evanston, USA).
- 24 May 2023, 15:00 MoRe-ASI seminar, Let's take a look inside!, prof. Luciano Iess (Dipartimento di Ingegneria meccanica e aerospaziale, Sapienza Università di Roma).
- 27 April 2023, 15:00 INAF-OAAb colloquia, Active volcanism on Venus: scientific implications and future perspectives through the Project "Analogues for VENUS's GEologically Recent Surfaces" (AVENGERS), Piero d'Incecco (INAF-Osservatorio Astronomico d'Abruzzo).

20 April 2023, 11:30	INAF-OAPD seminar, Galactic Archaeology. From multiple stellar populations in star clusters to extremely metal-poor stars, Giacomo Cordoni (University of Padua).
18 April 2023, 14:30	INAF-IASF Milan colloquium, Scaling Relations: a new framework for understanding the evolution of early type galaxies, Prof. Cesare Chiosi (University of Padua).
06 April 2023, 14:00	MoRe-ASI seminar, Exploring the Ocean Worlds of the outer solar system: the search for life beyond Earth, Dr. Anezina Solomonidou(Hellenic Space Center - HSC).
04 April 2023, 11:30	INAF-OAPD seminar, The First Galaxies with JWST - Discoveries and Properties, Prof. Christopher Conselice (Manchester University).
16 March 2023, 15:00	Web-SEMINAR at OAAb, Globular Cluster formation as a runaway process, Prof. Alvio Renzini (INAF - Osservatorio Astronomico di Padova).
01 Feb. 2023, 11:00	IAPS Seminar - The multiplicity of stellar populations of Globular Clusters, Santi Cassisi (INAF-Osservatorio Astronomico d'Abruzzo).
17 Jan. 2023, 14:00	Astrophysics Talk - Galactic dynamics with Gaia DR3: A new resonance-like feature in the outer disc of the Milky Way, Shourya Khanna (INAF-Torino).
11 Jan. 2023, 11:30	Astromeeing OACN - Dust production across the Asymptotic Giant Branch ... and beyond, Paolo Ventura.
7 Dec. 2022, 11:30	Astromeeing OACN - Low surface brightness galaxy population in the Centaurus cluster from the VEGAS Survey, Nicola Bellucco (PhD student at Padova University).
28 Nov. 2022, 15:00	Seminar at Department of Physics, Sapienza University of Rome - About the Observational Check of the Mechanism of Gamma Radiation in Soft Gamma Repeaters (SGR), Prof. Bisnovaty-Kogan (Space Research Institute, IKI, Moscow).
24 Nov. 2022, 11:30	Joint Astrophysical Colloquium - First stars and their chemical fingerprints, Stefania Salvadori (Università di Firenze).
17 Nov. 2022, 11:00	OATo Seminars - Gravity vs matter: stars as laboratory to test theories of gravity, Dr. Aneta Magdalena Wojnar (Laboratory of Theoretical Physics, Department of Theoretical Physics, Institute of Physics, University of Tartu)
16 Nov. 2022, 14:30	Joint Astrophysics Colloquium - Multiple populations in Globular Clusters in the era of JWST, Prof. Antonino Milone (University of Padua).
15 Nov. 2022, 14:00	Astrophysics Talk - Galactic archaeology using chemical clocks, Giada Casali (DIFA - Unibo).
21 Oct. 2022, 10:00	Soft skills - La leadership nei contesti professionali, Career Service Sapienza & Porta Futuro Lazio.
20 Oct. 2022, 16:00	Astroseminar - Dark matter, black holes and gravitational waves, Gianfranco Bertone (GRAPPA, Amsterdam).
18 Oct. 2022, 14:00	Astrophysics Talk - On the rotation curve of disk galaxies in General Relativity, Luca Ciotti (Università di Bologna).
14 Oct. 2022, 11:00	IFPU Colloquium - Dark Matter in the Universe, Katherin Freese (University of Texas at Austin).
14 Sept. 2022, 11:00	IAPS we seminar - Volcanism on Mercury, D. Rothery (The Open University, Milton Keynes, UK).
7 Sept. 2022, 14:30	Joint Astrophysics Colloquium - Comets as clues to the formation and evolution of planetesimals, Prof. Jurgen Blum (Technische Universität Braunschweig, German).
15 June 22, 15:30	JEDI Star Talk - The astrochemical trail from clouds to disks and planets, Ewine F. van Dishoeck (Leiden Observatory, Leiden University).
15 June 22, 14:30	Deciphering ALMA observations of protoplanetary disks Deciphering ALMA observations of protoplanetary disks, Prof. Cornelis P. Dullemond (Zentrum für Astronomie – University of Heidelberg.)
27 April 22, 15:00-18:00	Spazio, Ultima Frontiera II Edizione - Il Giornata, Sapienza Università di Roma.
13 April 22, 18:00	Masterclass   Excel, le basi: stili, gestione e organizzazione del foglio di lavoro
08 April 22, 16:00-17:00	Il tempo tra scienza e filosofia, Discovery Link Sapienza.
29 March 22, 10:00-12:00	Exploring the challenges, opportunities and the future of Space Education in Europe   European Space Policy Institute (ESPI)

08 Sept. 21, 14:00-15:00

23-28 April 21 e 4-7/05/21

3 Oct. 2019, 16:00-18:00

Employability Lab: Il ruolo dell'employability e delle risorse personali per la ricerca proattiva del lavoro | Sapienza Università di Roma.

Corso di Finanza Personale | Link Economics Sapienza Università di Roma

Fisica degli Esopianeti: Progetti futuri, pianeti abitabili e biosignatures (Lezione 15) | Cattedra "Enrico Fermi" 2018/2019, Prof.ssa Giovanna Tinetti

## Training courses

27 Jan. 2022

17 Jan. 2022

15 Dec. 2021

11 Dec. 2021

09 Dec. 2021

03 Dec. 2021

24 Nov. 2021

04 May 2021

06 May 2014

**Machine Learning with MATLAB**, MathWorks | Training Services.

**MATLAB Programming Techniques**, MathWorks | Training Services.

**MATLAB for Data Processing and Visualization**, MathWorks | Training Services.

**Deep Learning Onramp**, MathWorks | Training Services.

**Machine Learning Onramp**, MathWorks | Training Services.

**MATLAB Fundamentals**, MathWorks | Training Services.

**MATLAB Onramp**, MathWorks | Training Services.

**National course of online formation, Cyber Security - basic level**, INFN.

**European Computer Driving Licence ECDL**.

## Coding/software experience

Programming languages

**C** intermediate level (4 yrs, Bachelor's degree thesis and courses, PhD project), **Fortran** intermediate level (2 yrs, Master thesis, PhD project), **MATLAB** (for programming) basic level (PhD course) and **Python** intermediate level (2 yrs, INAF experiences and PhD project).

Professional skills

Basic experience (1 yr) with parallel codes: **PySPH** for hydrodynamical simulations, **MCLUSTER** and **NBODY6++** for setting initial conditions and perform N-body simulations of Globular Clusters respectively.

Data analysis and visualization

Experience with **MATLAB** (6 yrs) and **Python** (2 yrs) acquired during university courses, thesis work, INAF experiences and PhD project.

Document drafting

Experience of 6 yrs with **L<sup>A</sup>T<sub>E</sub>X**, in particular for scientific reports and papers drafting.

Remote control

Basic knowledge (2 yrs) of remote connection to servers for running numerical simulation using SSH and SFTP protocol or a remote desktop software like AnyDesk, Splashtop and TeamViewer.

Others

Intermediate experience in **Office automation** packages, in particular with software for presentation, document elaboration and spreadsheets, refined from Italian secondary school to today (around 12 yrs experience). Basic ability in managing videoconferencing.

## Teaching experiences

Tutoring

Occasional and sometimes regular tutoring of high school students in Math and Physics.

Others

Helping out with master degree thesis work of prof. Merafina students.