# Europass Curriculum Vitae

## Personal information


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| Name / Surname | **Matteo Teodori** |
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| Nationality | Italian |


## Research experiences

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

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| 16th Nov. 2021 | **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. |
| 1st Oct. 2019 | **Bachelor's degree in Physics, University of Rome "La Sapienza"**.Dissertation title: Carbon ignition curves for massive stars. Supervisor: Prof. Oscar Straniero |

## Publications

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| 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 extrasolar 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.

## Seminars

16th Feb. 2023 — **M. Teodori**, "*The interconnection between multi-mass dynamical models and multiple populations in Globular Clusters*", INAF-OOAb colloquia.

## PhD schools

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

## 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.

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| Document drafting | Experience of 6 yrs with LaTeX, 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

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| 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. |