



PERSONAL INFORMATION **Giovanni Padovano** ===== =====  ===== =====  
CV APPLIED FOR **Tutorship Activity**

## EDUCATION

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**University**November 2020 – ongoing **Ph.D student in Physics**

Sapienza University of Rome, Rome (IT).

Supervisors: Prof. S. Giagu and M. Bauce. Referee: A. Nisati.

Ph.D project in precision Standard Model physics with the ATLAS experiment at the LHC.

September 2017 - March 2020 **Master's Degree in Physics**

Sapienza University of Rome, Rome (IT).

Curriculum in Particle and Astroparticle Physics.

Thesis: *Search for invisible Higgs boson decays in the VBF production channel with the ATLAS experiment at the LHC*, supervisor: Prof. S. Giagu.

Mark: 110/110 cum laude.

September 2015 - November 2017 **Bachelor's Degree in Physics**

Sapienza University of Rome, Rome (IT).

Curriculum in Physics.

Thesis: *Direct Dark Matter detection with directional techniques*, supervisor: Prof. S. Giagu.

Mark: 110/110 cum laude.

September 2012 - July 2015 **Bachelor's Degree in Aerospace Engineering**

Sapienza University of Rome, Rome (IT).

Curriculum in Aerospace Engineering.

Thesis: *Zero-dimensional internal ballistics modelling of a hybrid rocket motor*, supervisor: Prof. D. Bianchi.

Mark: 110/110 cum laude.

**High School**September 2007 - July 2012 **Diploma di Liceo Scientifico (Science Major)**

Liceo Scientifico Statale "C. Cavour", Rome (IT).

Mark: 100/100.

ADDITIONAL INFORMATION ON  
PH.D. RESEARCH AND THESES

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**Ph.D. research activity**

My Ph.D. project focuses on Standard Model precision measurements involving the third family of leptons and quarks. I'm part of the High Mass Ztautau ATLAS analysis, whose goal is to perform a differential cross section measurement of the Drell-Yan process with di-tau leptons final state, followed by a forward-backward asymmetry precision measurement in the Z-pole region. My responsibilities in the analysis strategy include sample validation, background estimation, main selection definition. I'm also part of the ATLAS Phase-II upgrade project for the muon trigger system and I'm in charge of developing and testing of firmware for the L0 Barrel Sector-Logic board, using VHDL language and Xilinx Vivado toolkit.

### Master's thesis

Title	<i>Search for invisible Higgs boson decays in the VBF production channel with the ATLAS experiment at the LHC</i> , supervisor: Prof. S. Giagu.
Description	The thesis presents a search for invisible decays into Dark Matter of the Higgs boson in the vector boson fusion production channel, performed using $36 \text{ fb}^{-1}$ of $pp$ collision data at a center-of-mass energy of $\sqrt{s} = 13 \text{ TeV}$ , recorded in 2015 – 16 by the ATLAS experiment at the LHC. A measurement of the Higgs-to-invisible branching fraction has been obtained and identification strategies for hadronic jets have been discussed, with focus on high pseudorapidity jets emitted in high pile-up conditions. In particular, a new forward pile-up jet tagging algorithm is presented - consisting in a Deep Neural Network trained on Monte Carlo QCD multijet events - and is recognized as having higher performances with respect to the current jet tagging algorithm and the alternative proposals advanced for its future replacement.

### Bachelor's thesis

#### B.S. in Physics

Title	<i>Direct Dark Matter detection with directional techniques</i> , supervisor: Prof. S. Giagu.
Description	The thesis work discusses Dark Matter search with direct detection experimental techniques. The state of the art of direct detection experiments is outlined and directional direct detection techniques are discussed, aiming at measuring the direction of the incoming Dark Matter particle and to exploit the daily modulation of such direction instead of the annual modulation of the rate of events. The DarkSide-50 experiment at "Laboratori Nazionali del Gran Sasso" is presented as a case study and the implementation of a directional measurement is discussed, with focus on the role of columnar recombination.

#### B.S. in Engineering

Title	<i>Zero-dimensional internal ballistics modelling of a hybrid rocket motor</i> , supervisor: Prof. D. Bianchi.
Description	This study examines modern propulsion systems comparing liquid, solid and finally hybrid propulsors. In particular, a zero-dimensional numerical solver for internal ballistics prediction and performance calculation of a hybrid motor has been developed and used to discuss three preliminary design examples.

## RESEARCH ACTIVITIES AND SCHOOLS

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### Participation to research group activities

March 2019 - ongoing	<b>Master and Ph.D. student in the ATLAS-RM1 research group</b> Participation to the research activities of the ATLAS-RM1 group, based at Sapienza University of Rome and Istituto Nazionale di Fisica Nucleare as a master and then Ph.D. student. I am also affiliated to the ATLAS experiment.
March 2021 - ongoing	<b>Member of the High Mass Ztautau ATLAS working group</b>

Participation to the working group and relative physics analysis. The working group includes ~ 30 people from 8 institutes (Edinburgh University, Manchester University, London QMUL, London UC, Oxford University, Sao Paulo University, Annecy LAPP, Sapienza University of Rome).

March 2021 - ongoing **Member of the Phase-II Muon Trigger working group.**

Participation to the working group based at Sapienza University of Rome and INFN Roma for development of the new Phase-II muon trigger system of the ATLAS experiment.

March 2018 - March 2019 **Participation in the ATLAS VBF+MET working group**

Involvement as a Master student in the activities of the VBF+MET working group of the ATLAS collaboration.

## Schools

### CERN European school of High Energy Physics 2021

University of Tel Aviv, Tel Aviv (Israel).

Physics school organised by CERN which includes lectures, seminars, discussions and group projects on current topics in particle physics.

I have been selected by the organizing committee. The school has not yet been held due to COVID-19 pandemic.

## TALKS & OUTREACH ACTIVITIES

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### Talks

September 2021 107° congress of the Italian Physical Society.

Presentation title: Search for Higgs boson invisible decays in the VBF production channel with the ATLAS experiment at the LHC.

September 2021 ATLAS Young workshop.

Presentation title: Development of the readout system for the Phase-II upgrade of the ATLAS muon trigger.

### Outreach and educational activities

February 2021 International masterclass of particle physics.

September 2021 European Researchers Night 2021.

## EDUCATIONAL SKILLS AND SCHOOL

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March 2020 - July 2020 **Percorso “24CFU”.**

Sapienza University of Rome, Rome (IT).

“Percorso 24CFU” consists of four exams in the fields of Pedagogy, Anthropology, Didactic methods that provide training in education and didactics.

Exams sustained: “Didattica Generale” (Prof. P. Sposetti), “Pedagogia” (Prof F. Pesci), “Antropologia Culturale I” (Prof. A. Iuso), “Etnologia Europea” (Prof. A. Iuso).

May 2021 - ongoing **National selection for teaching in Italian high-school**

National selection for teaching in Italian high-school for the class A27 - Matematica e Fisica (Liceo Scientifico) and habilitation in the classes A20 - Fisica (Liceo Scientifico), A26-Matematica (Liceo Scientifico).

## COMPUTER AND PROGRAMMING SKILLS

This section collects an overview on computer and programming skills together with detailed information on all courses and trainings on programming attended.

### Programming languages and software

C, C++	Excellent knowledge, which includes HEP software packages (ROOT).
Python	Excellent knowledge, which includes deep-learning packages (Keras, Tensorflow).
R, Matlab	Good knowledge.
Other software	Mathematica, Latex, Office, MSC Nastran.
Hardware programming	VHDL, Xilinx Vivado toolkit.
Operating systems	Mac OS, Windows, Linux.

### University courses on programming

**Laboratorio di Calcolo:** Prof. R. Faccini. Introductory course on C programming language.

**Laboratorio di Fisica Computazionale:** Prof. A. Maiorano. Advanced course on C programming language, with elements of numeric calculus for scientific applications.

**Computing Methods for Physics (a.y. 2017/18):** Prof. L. M. Barone. General course on computing for high energy physics covering the following topics: trigger & data acquisition, Monte-Carlo methods, Perl/Python and scripting languages, Database (SQL, MySQL).

**Computing Methods for Physics (a.y. 2018/19):** Prof. S. Rahatlou. Advanced course on C++ and python programming languages.

**Probabilità ed incertezze di misura:** Prof. A. Messina, G. D'Agostini, F. Bellini. Ph.D. course on statistical methods which included development of practical applications in R and python language.

**Deep learning methods for physics:** Prof. S. Giagu. Ph.D. course on machine learning techniques for high-energy physics, which included hands-on sessions with deep neural networks development in python language.

### Trainings on programming

**HEP C++ Course and Hands-on Training:** advanced course on C++ programming language (1 week, full time). The course was organized by CERN in cooperation with the HEP software foundation and included concepts of C++ software engineering (up to the C++ '17 ISO standard).

## AWARDS

March 2014 - July 2015	<p><b>“Percorso di eccellenza”</b></p> <p>Sapienza University of Rome, Rome (IT).</p> <p>“Percorso di eccellenza” is the excellent students program offered by Sapienza University of Rome and includes extra advanced courses. Followed courses: partial differential equations, materials laboratory.</p>
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## LANGUAGES

Italian	Mother tongue.
English	Excellent knowledge (C1). Master's degree in Physics attended in English language. Summer language courses at Surrey University (2010) and Staffordshire University (2011).
French	Basic knowledge (B2).

## MUSICAL INTERESTS

### Education

October 2011 **Compimento of Flute**  
Conservatorio di Musica "L. Refice", Frosinone.

June 2011 **Licenza di teoria, solfeggio e dettato musicale**  
Conservatorio di Musica "L. Refice", Frosinone.

### Activities

2012-2016 Flute in MuSa, Sapienza University of Rome student orchestra, conductor M. F. Vizioli, Rome.  
Participation to the orchestra's rehearsals and concerts, both as second and as principal flute.

2009-2013 Flute summer courses, Accademia Musicale Iacopo Napoli, Cava de' Tirreni (Salerno).  
Summer courses of flute with M. Paolo Taballione and M. Salvatore Lombardi. The school included attendance as an auditor to the lessons of M. Davide Formisano, M. Andrea Manco, M. Maxence Larrieu, M. Peter-Lukas Graf, M. Jean-Claude Gérard.

November 2013 Recording of the soundtrack of RAI fiction "Qualunque cosa succeda. Giorgio Ambrosoli, una storia vera" (by A. Negrin). The fiction has been transmitted on the national channel RAI1 in 2014.

Roma, 10 ottobre 2021

F. to Giovanni Padovano