

● WORK EXPERIENCE

2019 – CURRENT – Italy

PHYSICIST (PHD STUDENT AND INFN ASSOCIATE) – UNIVERSITÀ DEGLI STUDI DI FERRARA AND INFN DEPARTMENT OF FERRARA

BESIII experiment - Analysis

As a PhD student and associate of the INFN (Istituto Nazionale di Fisica Nucleare) for the BESIII experiment (Beijing, China), I conducted independent scientific research; in particular

- I finalised the analysis (now undergoing the publication process) of the physical features of a not well known particle (namely the *charmonium state* $h_c(1^1P_1)$); for this I had to present my work in front of my reference subgroups and referees;
- For my PhD thesis I am conducting a search for a so-called "exotic particle" (namely the *tetra-quark state* $Z_c(4430)$); during this analysis I have to present updates in front of my reference subgroups.

BESIII experiment - CGEM-IT Project

I am also participating with the Italian subgroup of BESIII in developing a cylindrical Gas Electron Multiplier (CGEM) detector (called CGEM-IT) needed for an upgrade of the BESIII detector, by:

- developing a Geant4 simulation of two (out of the three expected) CGEM-IT layers that are currently in a white chamber in Beijing to better understand this detector properties;
- studying the quality of the tracking properties of the detector, contributing to the development and implementation of the tracking code ad-hoc developed for the CGEM-IT;
- participating, as a shifter, in a beam test at CERN, with the aim of validating the ad-hoc electronics system built for said detector.

uRANIA experiment

I also began to collaborate with the uRANIA experiment, an EU ATTRACT project, whose aim is to build an innovative detector for diffractive neutron imaging based on micro-Resistive WELL (μ -RWELL) technology. I am helping the group with

- *public outreach* by developing the public page of the experiment;
- the participation in a beam test at the neutron facility of ENEA (Frascati, Rome) with the aim of validating prototypes for this kind of technology
- data analysis of the data gathered during the beam test.

FCC collaboration

Finally, I also started working with the FCC collaboration, a communal effort to develop the next generation of particles detectors and accelerators. Within this framework I am studying two weak decay channels (namely $B_s^0 \rightarrow D_s^\pm K^\mp$ and $B_s \rightarrow J/\psi \phi$ with the aim of measuring a CKM matrix angle) to estimate the requirements, such as energy and space resolution, needed for said next-gen detectors.

01/2021 – 06/2021 – Ferrara, Italy

UNIVERSITY TEACHER AND TUTOR – UNIVERSITÀ DEGLI STUDI DI FERRARA

Tutor and teaching support for the:

- Bachelor's degree course "LT - Fisica I";
- Master's degree and PhD course "LM and PhD - Introduction to particle accelerators and detectors".

2018 – 2019

PHYSICIST (INFN ASSOCIATE) – UNIVERSITÀ DEGLI STUDI DI FERRARA AND INFN DEPARTMENT OF FERRARA

As an associate of the INFN (Istituto Nazionale di Fisica Nucleare) for the BESIII experiment (Beijing, China), I conducted independent scientific research (from the 01/06/2019 to 31/08/2019 as a research fellow in physics at Università degli Studi di Ferrara); in particular

- I continued the analysis of the physical features of a not well known particle (namely the *charmonium state* $h_c(1^1P_1)$); during this analysis I had to present updates, for which I also travelled to Beijing and Shanghai, in front of my reference subgroups;
- I also participated with the Italian subgroup of BESIII in developing a cylindrical Gas Electron Multiplier (GEM) detector needed for an upgrade of the BESIII detector, by performing data quality studies on the ad-hoc read-out electronic.

I also began to collaborate with the uRANIA experiment, an EU ATTRACT project, whose aim is to build an innovative detector for diffractive neutron imaging based on micro-Resistive WELL (μ -RWELL) technology. I started helping the group with *public outreach* by developing the public page of the experiment (available at this link: www.fe.infn.it/urania/), and I will be involved in data analysis.

Ferrara, Italy

2017 – 2019

PHYSICIST – DEUTSCHES ELEKTRONEN-SYNCHROTRON (DESY)

As a PhD (from which I withdrew before its natural end due to personal matters) student for the ATLAS experiment of the *Conseil européen pour la recherche nucléaire* (CERN) (Geneva, Switzerland), I conducted independent scientific research under the supervision of Dr. Kerstin Tackmann (main supervisor) and Prof. Dr. Peter Schleper (co-supervisor); in particular I was

- Integration Testing developer for the electron/photon subgroup:
- written the C++ code for such a test;
- been involved in the creation of a simple webpage for the visual display of such a test;
- presented the updates to the aforementioned subgroup and created a wiki page explaining the functionality of such a test.
- Main author and analyzer of a project aimed to provide a quantitative prospect of Higgs boson two decay modes (namely $H \rightarrow ZZ^* \rightarrow 4l$ and $H \rightarrow \gamma\gamma$) cross section for the Large Hadron Collider (LHC) expected upgrade; for said analysis I also presented updates and the final work to the subgroups under which I was working. The published note can be found at <https://atlas.web.cern.ch/Atlas/GROUPS/PHYSICS/PUBNOTES/ATL-PHYS-PUB-2018-040/>.

Notkestraße 85, 22607, Hamburg, Germany

2016 – 2017

PHYSICIST (MASTER STUDENT AND INFN ASSOCIATE) – UNIVERSITÀ DEGLI STUDI DI FERRARA AND INFN DEPARTMENT OF FERRARA

As an associate of the INFN (1 year), during my Master studies, for the BESIII experiment (Beijing, China), I conducted independent scientific research under the supervision of Prof. Isabella Garzia (main supervisor) and Dr. Gianluigi Cibinetto (co-supervisor); in particular

- I primarily conducted a measurement of the physical features of a not well known particle (namely the *charmonium state* $h_c(1^1P_1)$); during this analysis I had to present updates, for which I also travelled to Beijing and Guangzhou, in front of my reference subgroups;
- I also participated with the Italian subgroup of BESIII in developing a prototype of a cylindrical Gas Electron Multiplier (GEM) detector, as well as the detector itself, needed for an upgrade of the BESIII detector, by:
 - developing a MonteCarlo (MC) simulation of a detector tracking system containing the aforementioned detector, in order to test different working conditions;

- being involved with in-house measurements and analysis of different physical quantities related to the GEM detector.
- In October 2016, I spent, as a shifter, a week at CERN for a beam test, with the aim of validating the prototype of a GEM detector.

Ferrara, Italy

2016

PHYSICIST (SUMMER STUDENT) – FERMILAB

As a summer student I conducted independent scientific research under the supervision of Dr. Giulia Brunetti with the Fermilab group of NOvA, participating in the implementation of a Convolutional Visual Network applied to particle identification (in particular focusing on the neutral pion identification).

Batavia, United States

01/2016 – 06/2016

PHYSICIST (INTERNSHIP STUDENT) – LABORATOIRE DE L'ACCÉLÉRATEUR LINÉAIRE (LAL)

During the compulsory internship (5 months) I had to pursue during my first year of master in France (M1 General Physics), I conducted independent scientific research under the supervision of Dr. Lydia Iconomidou-Fayard with the LAL group of ATLAS, participating in the study of some figures of merit related to the performances of a Higgs boson decay mode (namely $H \rightarrow ZZ^* \rightarrow 4l$).

Orsay, France

2014 – 2015

PHYSICIST (BACHELOR STUDENT) – UNIVERSITÀ DEGLI STUDI DI FERRARA

During my Bachelor studies (8 months), for the BESIII experiment (Beijing, China), I conducted independent scientific research under the supervision of Prof. Mauro Savrié (main supervisor) and Dr. Gianluigi Cibinetto (co-supervisor); in particular

- I primarily wrote a C++ analysis code for beam test data and performed the analysis itself, aim of which was to study and characterize a planar prototype of a Gas Electron Multiplier (GEM) detector;
- In December 2014, I spent, as a shifter, a week at CERN for a beam test, with the aim of validating the prototype of a GEM detector.

Ferrara, Italy

2020 – CURRENT

SCIENTIFIC OUTREACH – UNIVERSITÀ DEGLI STUDI DI FERRARA AND INFN DEPARTMENT OF FERRARA

The main scientific outreach activity saw me as a co-organiser of the INFN pop science project (within the PI P - CC3M framework) "What next? Il futuro spiegato dai giovani". This project aims to introduce high energy physics to the general public with a never-before-seen approach, students and people below 30 years of age will be the presenters of the subject. For this project I personally took care of organisational tasks (such as defining the legal terms, acting as intermediary between local and national committees, handling the bureaucratic processes for the web design firm, etc.) and advertising campaign with the creation and operation of social media pages (Facebook, Instagram, TikTok and Twitter).

I also am involved in other scientific outreach activities, specifically:

- Within the framework of "Stage Estivo Fisica @UniFe" (part of the compulsory "Alternanza Scuola-Lavoro" project aimed to high school students), I introduced, through a brief theoretical and experimental course, high energy physics, the BESIII and FCC collaborations to high school students;

- Within the framework of "Porte Aperte al Polo Scientifico Tecnologico" (a project that aims to open the Scientific-Technological center of Ferrara to the general public), I presented the BESIII Ferrara group and introduced particle physics to students of all ages;
- Within the framework of "Laboratori della Fisica Moderna" (a Masterclass kind of project), via theoretical lectures I presented the Heisenberg's uncertainty principle to high school students. After the lectures, the students were brought in a laboratory and guided to prove this principle with a diffraction experiment.
- I participated in the organisation of the "Pint of Science" event in the city of Ferrara. I prepared the webpage describing the team and the events, and contributed to organize the evening venues, and to obtain patrons.

● EDUCATION AND TRAINING

06/2015 – 09/2017 – Università degli Studi di Ferrara (Italy) & Université Paris-Sud (France)

MASTER'S DEGREE IN PHYSICS – Double Master's Degree in Physics

The Double Master's Degree in Physics (DMDP) consists of a master degree held in two different institutions in two consecutive years. At the end of the two years, the DMDP grants two Master's Degrees from the two attended institutions.

- September 2016-September 2017: Master's Degree in Physics (M2) at Università degli Studi di Ferrara.
 - Graduated 110/110 **cum Laude** (aggregate average mark **29.88/30**) on the 8th of September 2017 with a Thesis titled "*Inclusive Measurements of $h_c(1^1P_1)$ in $\psi(2S)$ Decay*" under the supervision of Prof. Isabella Garzia.
 - **Related courses of the M2:** Nuclear Physics, High Energy Physics Laboratory, Phenomenology of the electroweak interactions.
- September 2015-July 2016: M1 General Physics at Université Paris-Sud.
 - **Related courses of the M1:** Particles, Nuclei & Universe, Solid State Physics, Statistical and Quantum Mechanics, Experiments and Applications in Sub-Atomic Physics, General Relativity & Cosmology, Sensors, Measurements & Signal Processing, Mathematical & Statistical Methods.

EQF level 7

07/2012 – 07/2015 – Ferrara, Italy

BACHELOR OF SCIENCE IN PHYSICS – Università degli Studi di Ferrara

Graduated 110/110 **cum Laude** (aggregate average mark **30.62 / 30**) on the 24th of July 2015 with a thesis titled "*Analisi dei dati di un test su fascio di un prototipo di rivelatore a GEM*" (Analysis of beam test data of a prototype of a GEM detector).

EQF level 6

07/2012 – Ferrara, Italy

DIPLOMA SCIENTIFICO (HIGH SCHOOL SCIENTIFIC DIPLOMA) – Liceo Scientifico Antonio Roiti

Final mark 100/100.

EQF level 4

2017 – 2020

PHYSICS AND STATISTICAL SCHOOLS

I attended:

- In October 2020, the online workshop "PHYSTAT - Flavour 2020", in which statistical issues in modern flavour physics experiments were presented.
- In June 2020, the online DESY "Terascale Statistical School", organised by DESY - Deutsches Elektronen-Synchrotron, which provided lectures on statistics applied to high energy physics.
- In September 2018, the "BND School", organised by DESY - Deutsches Elektronen-Synchrotron in Berlin. The school, intended for experimental high energy physicists, provided lectures on theoretical and experimental aspects of the field. I also attended lectures on machine learning and Geant4 detector simulation.
- In February 2018, the "Terascale Statistics School", organised by DESY - Deutsches Elektronen-Synchrotron in Hamburg. The school provided lectures on statistics applied to high energy physics.
- In May 2017, the "INFN School of Statistics", jointly organised by the INFN - Department of Napoli and Università degli Studi di Napoli "Federico II" in Ischia. The school provided lectures on statistics applied to high energy physics.

2018 – 2021

INTERDISCIPLINARY ACTIVITIES

Corso di formazione di base in materia di progettazione

*Università degli Studi di Ferrara and APRE – Agenzia per la Promozione della Ricerca Europea
03/2021 – 04/2021 Online*

I followed an advanced series of lectures on "Basic Training on European Design". Aim of course was to provide background information on the main features of the new European funding program "Horizon Europe".

Training for CAE Certification and CAE Exam Certification

*Università degli Studi di Ferrara and Inlingua School of Languages Ferrara
2020 – 01/2021 Online*

I followed a series of English language lectures in order to prepare for CAE Certification. In January 2021, I took the CAE Exam Certification which I passed at Grade A (overall score 203/210), achieving the C2 CEFR Level.

Advanced Computer Sciences and R!

*Università degli Studi di Ferrara
12/2020 – 01/2021 Online*

I followed an advanced series of lectures on IT and statistical softwares.

PIER Graduate Week

*Universität Hamburg
10/2018 Hamburg Germany*

The PIER (Partnership for Innovation, Education and Research) Graduate Week, an interdisciplinary lecture and workshop for young scientists. The workshop offered the "Entrepreneurship for scientist" course.

LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C1	C1	C1	C2
FRENCH	A2	B2	B1	B1	A2
GERMAN	A2	A1	A2	A2	A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

PUBLICATIONS

Publications

I am author and co-author of more than 100 publications ($h_{index}=36$), the list of which can be found at [inspirhep.net/author/profile/Marco.Scodggio.2](https://inspirehep.net/author/profile/Marco.Scodggio.2) (ORCID ID: 0000-0003-2064-050X). A selection of 15 publications can be found below.

1. L. Lavezzi *et al.*, "Performance of the micro-TPC Reconstruction for GEM Detectors at High Rate", **IEEE NSS/MIC 2017**, [10.1109/NSSMIC.2017.8532927](https://doi.org/10.1109/NSSMIC.2017.8532927)
2. L. Lavezzi *et al.*, "Test beam results with prototypes for the new Cylindrical GEM Inner Tracker of the BESIII experiment", **Nuovo Cim.C 41 (2018) 1-2, 78**, [10.1393/ncc/i2018-18078-7](https://doi.org/10.1393/ncc/i2018-18078-7)
3. G. Mezzadri *et al.*, "Test beam results of a Cylindrical GEM detector for BESIII experiment", **PoS MPGD2017 (2019) 048**, [10.22323/1.322.0048](https://doi.org/10.22323/1.322.0048)
4. L. Lavezzi *et al.*, "The new cylindrical GEM inner tracker of BESIII", **Int. J. Mod. Phys. Conf. Ser. 46 (2018) 1860077**, [10.1142/S2010194518600777](https://doi.org/10.1142/S2010194518600777)
5. R. Farinelli *et al.*, "A Cylindrical GEM Inner Tracker for the BESIII experiment at IHEP", **TIPP 2017**, [arXiv: 1807.00500](https://arxiv.org/abs/1807.00500) [[physics.ins-det](https://arxiv.org/abs/1807.00500)]
6. S. Marcello *et al.*, "A new inner tracker based on GEM detectors for the BES III experiment", **Int. J. Mod. Phys. Conf. Ser. 48 (2018) 1860119**, [10.1142/S2010194518601199](https://doi.org/10.1142/S2010194518601199)
7. M. Alexeev *et al.*, "Triple GEM performance in magnetic field", **JINST 14 (2019) 08, P08018**, [10.1088/1748-0221/14/08/P08018](https://doi.org/10.1088/1748-0221/14/08/P08018)
8. A. Amoroso *et al.*, "Time performance of a triple-GEM detector at high rate", **JINST 15 (2020) 06, P06013**, [10.1088/1748-0221/15/06/P06013](https://doi.org/10.1088/1748-0221/15/06/P06013)
9. R. Farinelli *et al.*, "Preliminary results from the cosmic data taking of the BESIII cylindrical GEM detectors", **JINST 15 (2020) 08, C08004**, [10.1088/1748-0221/15/08/C08004](https://doi.org/10.1088/1748-0221/15/08/C08004)
10. G. Aad *et al.* (ATLAS Collaboration), "Search for high-mass dilepton resonances using 139 fb⁻¹ of pp collision data collected at $\sqrt{s}=13$ TeV", **Phys. Lett. B 796 (2019) 68**, [10.1016/j.physletb.2019.07.016](https://doi.org/10.1016/j.physletb.2019.07.016)
11. M. Ablikim *et al.* (BESIII Collaboration), "Oscillating features in the electromagnetic structure of the neutron", **Nature Phys. 17 (2021) 11, 1200-1204**, [10.1038/s41567-021-01345-6](https://doi.org/10.1038/s41567-021-01345-6)
12. M. Ablikim *et al.* (BESIII Collaboration), "Observation of a Near-Threshold Structure in the K⁺ Recoil-Mass Spectra in $e^+e^- \rightarrow K^+(D_s^-D^{*0} + D_s^{*-}D^0)$ ", **Phys. Rev. Lett. 126 (2021) 10, 102001**, [10.1103/PhysRevLett.126.102001](https://doi.org/10.1103/PhysRevLett.126.102001)
13. M. Ablikim *et al.* (BESIII Collaboration), "Measurement of the cross section for $e^+e^- \rightarrow \Lambda$ anti- Λ and evidence of the decay $\psi(3770) \rightarrow \Lambda$ anti- Λ ", **Phys. Rev. D 104 (2021) 9, L091104**, [10.1103/PhysRevD.104.L091104](https://doi.org/10.1103/PhysRevD.104.L091104)
14. M. Ablikim *et al.* (BESIII Collaboration), "Search for new decay modes of the $\psi_2(3823)$ and the process $e^+e^- \rightarrow \pi^0\pi^0\psi_2(3823)$ ", **Phys. Rev. D 103 (2021) 9, L091102**, [10.1103/PhysRevD.103.L091102](https://doi.org/10.1103/PhysRevD.103.L091102)
15. M. Ablikim *et al.* (BESIII Collaboration), "Measurements of the branching fractions of $\psi(3686) \rightarrow$ anti- $\Sigma^0\Lambda + c.c.$ and $\chi_{cJ}(0, 1, 2) \rightarrow \Lambda$ anti- Λ ", **Phys. Rev. D 103 (2021) 112004**, [10.1103/PhysRevD.103.112004](https://doi.org/10.1103/PhysRevD.103.112004)

● CONFERENCES AND SEMINARS

09/2021 – Online

107° Congresso Nazionale della SIF

Speaker at the "107° Congresso Nazionale della SIF" with a short presentation titled "Osservazione dello stato esotico Z_{CS} presso l'esperimento BESIII"

07/2021 – Online

EPS-HEP Conference 2021

Speaker at the "EPS-HEP 2021" conference with a presentation titled "Charmonium decays at BESIII"

09/2020 – Online

106° Congresso Nazionale della SIF

Speaker at the "106° Congresso Nazionale della SIF" with a short presentation titled "Aggiornamento sulle misure degli stati XYZ presso l'esperimento BESIII"

01/2021

ECU 2021 - 1st Electronic Conference on Universe

Speaker at the "ECU 2021" with a presentation titled "Physics with Future Leptonic Colliders"

● SCHOLARSHIPS AND AWARDS

02/2020

Scholarship for technological training activities dedicated to recently graduated students

Awarded with a 24-month INFN scholarship dedicated to recently graduated students for technological training activities titled "*Sviluppo e test di algoritmi di ricostruzione per il rivelatore a GEM cilindriche di BESIII – Development and test of reconstruction algorithms for the BESIII cylindrical GEM detector*".

05/2019

Scholarship for post-graduate research activities

Awarded with a 3-month scholarship dedicated to recently graduated students for scientific research activities.

05/2018

Ferrara School of Physics

Awarded with the honorific diploma "*Ferrara School of Physics*", obtained for having attained an international curriculum with excellent results, mastering English in a scientific framework.

07/2015

"Idex Paris-Saclay" scholarship

Awarded with the "*Idex Paris-Saclay*" scholarship to spend the first year of my master's degree in Physics at the Université Paris-Sud (France).

● SOCIAL AND POLITICAL ACTIVITIES

01/2021 – CURRENT

Academic Senator

Università degli Studi di Ferrara, Italy

As a senator, I participate in monthly meetings to discuss the status of the University. In particular, I am tasked to formulate proposals for the teaching management, the research organisation and the student services, to express opinions on the budget and the final account, and to approve the University regulations.

12/2020 – CURRENT

Students councillor

Università degli Studi di Ferrara, Italy

As a councillor, I participate in monthly meetings to discuss the status of the students at the University. I am tasked to propose opinions and ideas (regarding, e.g., the teaching management, students services and fees) to the Academic Senate on possible resolutions to improve the students' life and to help to implement the right to education.

11/2020 – CURRENT

Treasurer of ADI local branch

Ferrara, Italy

ADI (Associazione Dottorandi in Italia) is a union which represents and defends the rights of the PhD students, PostDocs, and young researchers.

As a treasurer, I am responsible for the money in our local branch. In particular, I oversee the economic side of the membership processes, the advertising campaigns, and the cultural events.

DICHIARAZIONE SOSTITUTIVA DI CERTIFICAZIONE (art. 46 e 47 D.P.R. 445/2000)

- Il sottoscritto, ai sensi e per gli effetti degli articoli 46 e 47 e consapevole delle sanzioni penali previste dall'articolo 76 del D.P.R. 28 dicembre 2000, n. 445 nelle ipotesi di falsità in atti e dichiarazione mendace, dichiara che le informazioni riportate nel presente curriculum vitae corrispondono a verità.

- Il sottoscritto dichiara di essere informato/a, ai sensi del d.lgs. n.196/2003 e del GDPR 679/16 – “Regolamento europeo sulla protezione dei dati personali” che i dati personali raccolti saranno trattati anche con strumenti informatici esclusivamente nell'ambito del procedimento per il quale la presente dichiarazione viene resa e per tutti gli adempimenti connessi.

Data

09/12/2021

Firmato
MARCO SCODEGGIO