

# Federica Giacchino

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## ● WORK EXPERIENCE

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01/06/2021 – CURRENT ROMA, Italy

### RESEARCHER PHYSICS INFN-SEZIONE ROMA TOR VERGATA

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Fermi-LAT team member in Roma2 University and ASI Space Science Data Center

Phenomenological studies of dark matter models (WIMP e ALP) in astroparticle with X and gamma searches, studies on astrophysical object as blazars and radio sources:

- Dark matter models from astrophysical signals: spectral irregularities from ALP-photon oscillations, unID sources of Fermi-LAT analysis in multifrequency range and new physics interpretations
- Blazar and radio sources with multifrequency analysis SWIFT (XPEC), FERMI-LAT (Fermipy)
- Services for FermiLAT: shifts flare advocate, data acquisitions, data analysis, catalogs
- Analysis of future satellites in keV and MeV range for GRB polarisation, research of ALP oscillation from pre-SN
- Seminars, collaboration meetings, ATel

01/01/2021 – 31/03/2021 Frascati, Italy

### COLLABORATION THEORETICAL GROUP WITH LNF-INFN

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Background analysis for PADME at NLO of  $e^+e^- \rightarrow \gamma\gamma$

15/10/2018 – 14/12/2020 Frascati, Italy

### RESEARCHER PHYSICS LNF-INFN

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Team member of PADME (Positron Annihilation into Dark Matter Experiment). Phenomenological studies of feebly interactive particle production using PADME data in collaboration with theoretical group of Enrico Nardi at LNF:

- Dark sector studies with ALP and dark photon in visible and invisible decay channels
- Background studies at NLO with CheckMate, MadGraph, Calchep and Babayaga event generator
- Data analysis, MC script for PADME ALP analysis
- Data acquisition and shift

21/05/2018 – 20/07/2018 Pisa, Italy

### RESEARCHER PHYSICS INFN-SEZIONE PISA

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Observable studies in future collider

2014 – 2016 Bruxelles, Belgium

### ASSISTENT PROFESSOR UNIVERSITÉ LIBRE DE BRUXELLES

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## ● EDUCATION AND TRAINING

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15/09/2005 – 28/10/2010 PALERMO, Italy

### PHYSICS Università degli Studi di Palermo

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1. 6 months in Osservatorio Astronomico di Palermo: preliminary studies of DM in astroparticle framework.
2. 4 months in Istituto di Astrofisica Spaziale e Fisica Cosmica di Palermo (IASFPa/INAF): cosmic ray at UHE, detection techniques at Auger.

**Field of study** Fisica

8 months of research activity for Master Thesis at LPT Paris Orsay with Yann Mambrini: production mechanisms of DM in early universe, freeze-out e freeze-in, theoretical studies and data comparison for Higgs Portal and Z' portal.

**Field of study** Fisica | **Final grade** 110/110 con lode | **Thesis** DARK MATTER AND HIGGS PHYSICS AT THE LHC

01/02/2013 – 22/09/2017 Bruxelles, Belgium

**PHD PHYSICS** Université Libre de Bruxelles

Model building e pheno of Dark Matter Simplified Models. New t-channel simplified model, the Vector-like Portal. Cosmological analysis for production in early universe, parameter space constraints on three detection methods, in the scenarios (leptophilic, soft quark coupling and top quark coupling). Radiative corrections computations and detectability studies.

**Thesis** A Dark Matter Through the Vector-like Portal

## ● LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
<b>ENGLISH</b>	B2	B2	B2	B2	B2
<b>FRENCH</b>	C1	C1	B2	B2	B1

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

## ● DIGITAL SKILLS

Padronanza del Pacchetto Office (Word Excel PowerPoint ecc) | Microsoft Office ( Microsoft ) | Linguaggi di Programmazione: C++, Python, MATLAB | LATEX | Wolfram Mathematica [Wolfram Research] | CALCHEP | MICROMEGA | jupiter notebook | Padronanza del pacchetto office ed equivalente iWork | TOPCAT | jetset | feynncalc | feynrules | MEGALIB | SSDC tool | checkmate | MadGraph

## ● PUBLICATIONS

2013

[Scalar dark matter models with significant internal bremsstrahlung](#)

2014

[Bremsstrahlung and gamma ray lines in 3 scenarios of dark matter annihilation](#)

2016

[Signatures from scalar dark matter with a vector-like quark mediator](#)

2017

[A Dark Matter through the Vector-like Portal](#)

Ph.D Thesis

2018

[Top-philic vectorlike portal to scalar dark matter](#)

2018

[Radiative corrections to vectorlike portal dark matter](#)

2019

[Strong dynamics and dark matter: investigating a minimal setup](#)

2019

## **A light dark matter portal: The axion-like particle**

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Frascati Phys.Ser. 69 (2019) 206-211

2020

## **[Operation and performance of the active target of PADME](#)**

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2020

## **[Characterisation and performance of the PADME electromagnetic calorimeter](#)**

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2021

## **[Invisible decays of axion-like particles: constraints and prospects](#)**

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2021

## **[The PADME detector](#)**

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2021

## **[Search for a Dark Photon with the PADME experiment](#)**

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2022

## **[The physics program of the PADME experiment](#)**

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2022

## **[Search for New Cosmic-Ray Acceleration Sites within the 4FGL Catalog Galactic Plane Sources](#)**

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2022

## **[Incremental Fermi Large Area Telescope Fourth Source Catalog](#)**

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2022

## **[Commissioning of the PADME experiment with a positron beam](#)**

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2022

## **[Dark sector studies with the PADME experiment](#)**

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2023

## **[Overview of feebly interacting particle in indirect detection searches](#)**

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2023

## **[Cross-section measurement of two-photon in-flight annihilation of positrons at \$\sqrt{s} = 20\$ MeV with the PADME detector](#)**

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2023

## **[Fermi-GBM Discovery of GRB 221009A: An Extraordinarily Bright GRB from Onset to Afterglow](#)**

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2023

## **[The Third Fermi Large Area Telescope Catalog of Gamma-Ray Pulsars](#)**

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## ● **CONFERENCES AND SEMINARS**

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07/2014 International Summer School Institut d'Études Scientifiques de Cargèse, Cargèse (France)

### **Real Singlet Scalar DM and spectral features**

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10/2015 Journée des doctorants de l'école Panda, Mons (Belgio)

### **Signature from Dark Matter in Vector-like portal**

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10/2015 "Schule für Astroteilchenphysik", Obertrubach (Germany)

### **Signature from Dark Matter in Vector-like portal**

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09/2016 Summer School “Invisible 2016”, SISSA (Italia)

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### **Signature from Dark Matter in Vector-like portal**

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12/2018 7th Rome Joint Workshop: Current topics in Particle Physics, INFN-LNF (Italy)

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### **A new Simplified Dark Matter Model: the Vector-like Portal**

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06/2019 Photon 2019 , LNF-INFN (Frascati, Italia)

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### **A Light Dark Matter Portal: the axion-like particle**

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06/2019 Invisible19 Workshop, Valencia (Spagna)

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### **Axion-like Particle Phenomenology at PADME experiment**

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11/2019 Second Rome Physics Encounters, LNF-INFN (Frascati, Italia)

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### **Axion-like Particle as Light Dark Matter Portal**

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12/2019 Dark Matter and the Multiverse, Università di Roma Tre (Roma, Italia)

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### **Searches of Light Dark Matter Portal**

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02/2020 INTERNATIONAL DAY OF WOMEN AND GIRLS IN SCIENCE, LNF-INFN (Frascati, Italia)

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### **Una Siciliana in giro per l'Europa alla scoperta di una particella che si “sente” ma non si vede**

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02/2020 Agenzia Spaziale Italiana (ASI) (Roma-Italy)

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### **Searching for Light Dark Matter Portals**

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09/2020 106 Congresso Nazionale SIF 2020 (online)

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### **Studi per un generatore di eventi multifotonico per PADME**

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10/2020 DARK MATTER DAY(online)

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### **Ospite alla diretta nei canali dell'INFN come esperto sulla materia oscura**

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09/2022 RICAP-2022 Conference (Roma, Italia)

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### **Overview of feebly interacting particle in indirect detection searches**

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10/2022 DARK MATTER DAY (online)

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### **Ospite alla diretta nei canali dell'INFN come esperto sulla materia oscura**

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02/2023 FERMI ITALIA, Bari “Università di Bari”

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### **Dark Matter Searches**

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04/2023 Fermi MasterClass Università Roma2 (Roma, Italia)

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### **Esperimento Fermi-LAT**

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09/2023 Collaboration Meeting Fermi-LAT (online)

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### **Multi-frequency observation of a gamma-ray flare from the young radio source 3C 216**

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09/2023 Collaboration Meeting Fermi-LAT (online)

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### **Applying SSDC tools to investigate high latitude unassociated objects**

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11/2023 International Cosmic Day - Università Roma TorVergata

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### **Raggi Cosmici e Materia Oscura**

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## ● **MEMBRO DEL COMITATO ORGANIZZATORE LOCALE**

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04/2020

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### **XX LNF Spring School “Bruno Touschek” in Nuclear, Subnuclear and Astroparticle Physics, LNF-INFN (Frascati, Italy)**

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11/2022 – CURRENT

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### **International Cosmic Day presso Università Roma Tor Vergata (Roma, Italia)**

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04/2023 – CURRENT

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### **Fermi Masterclass, Roma “Università di Roma Tor Vergata”**

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● **TELEGRAMMI**

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01/2022

**Fermi LAT detection of renewed GeV gamma-ray activity of PKS 1413+135**

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Link <https://www.astronomerstelegam.org/?read=15163>

02/2022

**Fermi-LAT Gamma-ray Observations of IceCube-220205A**

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Link <https://gcn.nasa.gov/circulars/31557>

04/2022

**Fermi LAT detection of increasing gamma-ray activity of radio quasar 3C 345**

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Link <https://www.astronomerstelegam.org/?read=15313>

06/2022

**AGILE confirmation of the gamma-ray flaring activity from the FSRQ 3C 345**

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Link <https://www.astronomerstelegam.org/?read=15314>

04/2022

**Swift XRT follow-up observations of the flat spectrum radio quasar 3C 345**

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Link <https://www.astronomerstelegam.org/?read=15328>

04/2022

**GRB 220408B: Fermi-LAT detection**

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Link <https://gcn.nasa.gov/circulars/31896>

03/2023

**Fermi-LAT detection of increasing gamma-ray activity from blazar PKS 2054-377**

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Link <https://www.astronomerstelegam.org/?read=15947>

05/2023

**Fermi LAT detection of increasing gamma-ray activity from Compact Steep-Spectrum Radio Source 3C 216**

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Link <https://www.astronomerstelegam.org/?read=16024>

05/2023

**Fermi LAT detection of increasing gamma-ray activity from flat spectrum radio source PMN J1913-3630**

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Link <https://www.astronomerstelegam.org/?read=16033>

12/2023

**Fermi-LAT detection of renewed gamma-ray activity from the FSRQ OP 313, and enhanced gamma-ray activity from the FSRQ ON 393**

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Link <https://www.astronomerstelegam.org/?read=16356>

02/2024

**Fermi LAT detection of increasing gamma-ray activity from flat spectrum radio quasar PMN J0643+0857**

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Link <https://www.astronomerstelegam.org/?read=16429>

03/2024

**Fermi LAT detection of a possible gamma-ray flaring from the flat spectrum radio source 87GB 160630.8+495728**

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**Link** <https://www.astronomerstelegam.org/?read=16556>

04/2024

**Fermi-LAT detection of a possible gamma-ray flaring from the flat spectrum radio source B2 2125+35**

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**Link** <https://www.astronomerstelegam.org/?read=16590>

06/2024

**Fermi-LAT detection of a possible gamma-ray flare from TXS 1623+578**

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**Link** <https://www.astronomerstelegam.org/?read=16639>

06/2024

**Fermi LAT detection of GeV gamma-ray activity from FR-I radio galaxy SBS 1343+537 and the FSRQ TXS 0946+181**

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**Link** <https://www.astronomerstelegam.org/?read=16671>

06/2024

**Fermi LAT detection of a GeV gamma-ray flare from the high-redshift flat spectrum radio quasar S5 0212+73**

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**Link** <https://www.astronomerstelegam.org/?read=16679>

06/2024

**Fermi LAT detection of renewed GeV gamma-ray activity from the flat spectrum radio quasar OQ 334**

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**Link** <https://www.astronomerstelegam.org/?read=16680>

ROMA, 18/07/2024

