

PERSONAL INFORMATION

Marco Guarise

Date of birth 31/12/1990

WORK EXPERIENCE

01/12/2014–31/10/2016

Junior Grant (Assegno di ricerca) 23 months

Dipartimento di Fisica e Astronomia, Università di Padova, Padova (Italy)

Title: "Semiconduttori veloci sotto l'azione di impulsi laser: un possibile schema sperimentale per variare ad elevata frequenza le condizioni al contorno del campo elettromagnetico risonante in una cavità a microonde"

Supervisor: dott. C. Braggio

Investigation of fast periodically perturbation of boundaries condition in a microwave cavity resonator for the study of the dynamic Casimir effect.

Study of the photo-conductivity of gallium-arsenide in microwave region (GHz).

Study of third order microwave generation from non-linear crystals under high repetition rate laser pulses.

01/10/2017–Present

University teaching assistant

Dipartimento di Fisica e Scienze della Terra, Università di Ferrara, Ferrara (Italy)

Teaching support for the course "Laboratorio di Fisica con elementi di statistica ed informatica" for the Laurea in Fisica. Academic years 2017-2018 and 2018-2019. Settore scientifico disciplinare: FIS/01

Responsible: Prof. E. Luppi

Total hours: 30 AA 2017-2018, 30 AA 2018-2019

EDUCATION AND TRAINING

09/2004–06/2009

Scientific High School

EQF level 4

Liceo ginnasio G.B. Brocchi, Bassano del Grappa (Italy)

General knowledge in humanistic subjects (Italian literature, English literature, history, philosophy)

General knowledge in natural and scientific science (mathematics, physics, chemistry, biology)

Grade: 100/100

10/2009–10/2012

Bachelor degree in Physics (Laurea in Fisica L-30)

EQF level 6

Università di Padova, Padova (Italy)

General knowledge in mathematics

General knowledge in modern Physics (general physics, quantum mechanics, atomic physics, nuclear physics, solid state physics, particle physics)

General knowledge in theoretical Physics (analytical mechanics, statistical mechanics, mathematical method for physics, numerical calculation)

General knowledge in experimental physics (data analysis, realization of simple experiments)

Thesis title: "Polarizzazione di radiazione infrarossa emessa da fili sottili di Tungsteno all'incandescenza"

Supervisor: Prof. A.F. Borghesani

Grade: 92/110

10/2012–10/2014

Master degree in Physics (Laurea Magistrale in Fisica LM-17)

EQF level 7

Università di Padova, Padova (Italy)

Extensive knowledge in Particle Physics

Extensive knowledge in Matter Physics

Extensive knowledge in Experimental Physics

Thesis title: "Polarization of the incandescence light emitted by thin, hot tungsten and cobalt wires"

Supervisor: Prof. A.F. Borghesani

Grade: 108/110

01/11/2016–Present

PhD student

Università di Ferrara e Laboratori Nazionali di Legnaro INFN, Ferrara (Italy)

Development of a novel class of particle detectors based on Rare Gas crystals and characterized by a low energy threshold in a large volume necessary for dark matter studies.

Doctoral scholarship co-funded by Laboratori Nazionali Legnaro of INFN and Università di Ferrara

Thesis title: "Particle detection in Rare Gas crystals: a feasibility study"

Supervisor: Prof. R. Calabrese

Co-supervisor: Prof. L. Tomassetti

12/2016

Visiting student (1 month)

University of British Columbia, Vancouver (Canada)

Training activity with the group of Prof. T. Momose. Preparation of Para-hydrogen and relative set-up. Matrix isolation spectroscopy.

PERSONAL SKILLS

Mother tongue(s)

Italian

Foreign language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	B2	B1	B1	B2
	B1				
French	A2	A2	A1	A1	A1

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages

Job-related skills

■ Physics department, University of Ferrara: October 2017-present

Spectroscopic study for the implementation of a molecular Oxygen detector.

Acquired skills: VIS-NIR Wavelength Modulation Spectroscopy (WMS). DFB laser system. Diode laser systems and optical fiber assembly.

■ INFN Laboratori Nazionali Legnaro: October 2016-present

Study of a new possible class of detector with low energy threshold.

Acquired skills: ultraviolet, visible and infrared spectroscopy, alignment of continuous wave tunable laser systems (Ti:Sa and dye lasers), assembly X-rays excitation systems, realization of vacuum and cryogenics set-up. Test and development of novel detection schemes for light and particles. Use of photodetector systems.

Knowledge of the mainly properties of the rare-earth doped crystals.

■ Dipartimento di Fisica e Astronomia Università di Padova: December 2014-October 2016

Study of fotoconductivity of fast semiconductors and study of non-linear crystals

Acquired skills: design and realization of microwave cavity resonator, characterization of resonator with vector analyser, use of RF equipments, alignment and use of Q-switched laser systems, alignment and use of mode-locked laser systems.

Knowledge of the mainly characteristics of gallium-arsenide and non-linear crystals.

■ INFN Laboratori Nazionali di Legnaro: February-October 2014

Thesis work: study of the polarization of the thermal radiation emitted by incandescent wires of tungsten and cobalt.

Acquired skills: design and mount of optical systems, use of phase sensitivity detectors (lock-in amplifier), acquire and analyze signals, Labview programs.

Knowledge of the mainly features of the metallic tungsten and cobalt.

Digital skills

General knowledge of the operating systems: Linux, Microsoft Windows, Mac OS.

Basic programming in C++ and Labview.

General knowledge of Wolfram Mathematica.

Proficient user of Latex and Microsoft Office.

ADDITIONAL INFORMATION

Conferences

Presentation at International conferences and workshops:

1) IEEE Nuclear Science Symposium and Medical Imaging Conference (Manchester 26 October - 2 November 2019)

Accepted oral presentation: "Rare Gas solids detectors"

Received a grant of 500€

2) 15th Topical Seminar on Innovative Particle and Radiation Detectors (14-17 October Siena)

Accepted oral presentation: "Cosmic rays detection in solid Xenon"

Received a grant of 320€

3) 15th Vienna conference of Instrumentation (Vienna 18-22 February 2019)

Poster presentation: "Particle detection in Rare Gas solids"

4) Workshop on dark matter and neutrinos detectors (Padova 15-16 October 2018)

Oral presentation: "Large, defect-free RG crystals growing methods"

5) 4th conference on science, application and technology of Xenon radiation detector (Tokyo 18-21 September 2018)

Oral presentation: "Solid matrices of Rare Gases for particle detection"

Received a prize of 10000Y

6) Frontier detectors for frontier physics: 14th Pisa meeting on advanced detectors (Isola d'Elba 27 May-2 June 2018)

Poster presentation: "Novel approaches in low energy threshold detectors for dark matter searches"

Received a grant of 500€

7) 102 Congresso Nazionale Società Italiana di Fisica (Padova 26-30 September 2016)

Oral presentation: "A novel detector based on the IRQC scheme"

Seminars Participation at International schools and seminars:

- "Advanced school on quantum detectors" SQUAD, 18/9-20/9 2019 Trento University and FBK
Topics: principles and technologies in the field of Single-Photon Detectors for fundamental physics and applications

- VIII International Course "Detectors and Electronics for High Energy Physics, Astrophysics, Space Applications and Medical Physics" INFN LNL 1/4-5/4 2019
Topics: particle detectors, semiconductor devices, radiation effects, irradiation facilities.

- XXIX Seminar of Nuclear and Subnuclear Physics "Francesco Romano" INFN Bari 25/05-1/06 2017
Topics: high energy physics, applied physics, astroparticle physics, dark matter.

Publications List of publications:

- 1) Particle detection in Rare Gas solids: DEMIURGOS experiment, M. Guarise et al., accepted for publication in Nucl. Instrum. Meth. Phys. Proc. (2019)
Personal contribution: Apparatus development, measurements and data analysis. Writing of the article.
Corresponding author

- 2) Dark matter search by laser spectroscopy, G. Carugno et al., Proceeding of the 20th International Conference and School on Quantum Electronics: Laser Physics and Applications, 11047, 110470Q (2019)
Personal contribution: Apparatus development, measurements and data analysis.

- 3) Novel approaches in low energy threshold detectors for Dark Matter searches, M. Guarise et al., Nucl Instrum. Meth. A, 936, 244 (2018).
Personal contribution: Apparatus development, measurements and data analysis. Manuscript writing.
Corresponding author

- 4) Axion dark matter detection by laser spectroscopy of ultracold crystals: AXIOMA status report, C. Braggio, LNL Ann. Rep., 251, 154 (2018)
Personal contribution: Set-up development and measurements.

- 5) Axion dark matter detection by laser induced fluorescence in rare-earth doped materials, C. Braggio et al., Sci. Rep. 7, 15168 (2017).
Personal contribution: Set-up development and measurements.

- 6) Optical Manipulation of a Magnon-Photon Hybrid System, C. Braggio et al., Phys. Rev. Lett., 118, 107205 (2017).
Personal contribution: Set-up development, measurements and partial data analysis. Partial writing.

- 7) A new technique for infrared scintillation measurements, F. Chiossi et al., Nucl Instrum. Meth. A, 855, 13 (2017).
Personal contribution: Set-up definition, measurements.

8) Experimental setup for the growth of solid crystals of inert gases for particle detection, M. Guarise et al., Rev. Sci. Instrum. 88, 113303 (2017)

Personal contribution: Development of the set-up, measurements and data analysis. Manuscript writing.

Corresponding author

9) Cathodo- and radioluminescence of Tm³⁺:YAG and Nd³⁺:YAG in an extended wavelength range, A.F. Borghesani, et al, J Lumin., 190, 29 (2017).

Personal contribution: Development of the set-up and partial measurements.

10) Searching for Galactic Axions—QUAX-RDEperiment, C. Braggio et al, LNL Ann. Rep. 242, 174 (2016)

Personal contribution: Partial measurements

11) Er³⁺:YAG quantum counter as particle detector, A.F. Borghesani et al, LNL Ann. Rep. 242, 168 (2016)

Personal contribution: Measurements and data analysis. Writing of the article.

Corresponding author

12) Microwave emission by nonlinear crystals irradiated with a high-intensity, mode-locked laser, A.F. Borghesani, et al, J. Opt 18, 065503 (2016).

Personal contribution: Measurements and data analysis.

13) Particle detection through the quantum counter concept in YAG:Er³⁺, A.F. Borghesani, et al, Appl. Phys. Lett. 107, 193501 (2015).

Personal contribution: Development of the optics and particle set-up. Measurements and analysis of the data. Partial writing of the article.

Third mission

Third Mission and outreach:

- guide activity for students at the Legnaro National Laboratory from the year 2015
- scientific outreach at the "Salone internazionale del libro Torino" May 2019
- scientific outreach at the "European night research" Padova September 2018
- scientific outreach at the "Salone internazionale del libro Torino" May 2018
- scientific outreach at the "European night research" Padova September 2017

I authorize the treatment of my personal data (Reg. UE 2016/679 (GDPR)).